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This book contains guidance to participants in EPA's construction grants program. It provides information and suggested procedures to help communities successfully plan and design municipal sewage treatment works, and to construct them with Federal financial support. Because this book in in fact guidance, the recommendations it presents are discretionary with each program participant.

A major purpose of this volume is to help communities seeking or managing a construction grant to comply with all program requirements contained in Federal regulation.

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United States Environmental Protection Agency

Office of Water Program Operations
Washington, D.C. 20460

July, 1982

PREPARED BY:

Municipal Construction Division and
Facilities Requirements Division
Office of Water Program Operations
Environmental Protection Agency
Washington, DC 20460

Task Officers: Lam Lim and H. William Kramer

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*M - 40 CFR Part 35, Subpart I, Grants for Construction of Treatment Works

*N - 40 CFR Part 33, Procurement Under Assistance Agreements

O - Alternative Justifiable Expenditure Method of Cost Allocation

* Note: Complete document not included in draft package.

FOREWORD

This book (CG-82) is part of our ongoing effort to simplify and delegate the municipal construction grants program. It includes provisions of the Municipal Wastewater Treatment Construction Grants Amendments of 1981, enacted on December 29, 1981, and its implementing regulations published as an interim final rule in the Federal Register on May 12, 1982. The 1981 amendments significantly altered the procedural and administrative aspects of implementing the Clean Water Act of 1977 but did not alter the National goal of clean water.

The regulations implementing the 1981 amendments contain the requirements for grant assistance under the construction grants program. To distinguish restated regulatory requirements from discretionary guidance or suggestions of good practice in CG-82, the following conventions are used. Requirements use the words "must" or "will", or are written as imperative statements, and are identified by a bar in the margin. If there appears to be a difference between the regulations and the restatement in CG-82, the regulations govern. Recommended methods or formats to meet the regulatory requirements use the word "should". Suggestions of good practice, which may not relate to a particular requirement, use the words "can" or "may". A municipality is not required to follow the guidance in CG-82 in order to qualify for Federal grant assistance.

The reason for this significant departure from previous policy is our desire to focus on the statutory and program requirements that are necessary to ensure effective project management. Our concern is results, not procedures, and we want those results achieved in the most effective and reasonable manner possible. The guidance in CG-82 is being provided to facilitate achieving those results at reasonable costs. Where a municipality or State develops alternative procedures to meet the stated results, then those procedures are satisfactory. The cost of following the Step 3 guidance described in this book is allowable for grant participation if approved by the reviewing agency. An allowance for planning and design costs will be part of any grant for building the project if no previous Step 1 or Step 2 grant has been awarded. Costs for individual activities are not segregated and cannot be negotiated in addition to the allowance.

As we continue our deregulation efforts, we will reevaluate and revise CG-82 and other guidance materials as appropriate. We remain committed to reducing the procedural requirements for planning, design, and building of wastewater treatment works, to publishing new requirements (with the exception of those specified by law or executive order), and to facilitate delegation of the review and approval of projects to the States.

EPA intends that requirements be in the regulations only and therefore, CG-82 replaces the former system of PRMs and POMs. Upon publication of CG-82, all PRMs and POMs are cancelled (Appendix A). This book and the revised regulations (Subpart I of Part 40) apply to grants made on or after May 12, 1982. For grants made before that date, the regulations and guidance in effect at the time the grant was made still apply to those grants.

We plan to update the document to account for any changes in the construction grant regulations when they are promulgated in final form. For this reason, we are encouraging additional public comments on CG-82 and will use these to make final revisions in the document (which will appear as CG-83). Send any comments or suggestions to the Director, Municipal Construction Division, Office of Water Program Operations (WH-547), Environmental Protection Agency, Washington, D.C. 20460.

INTRODUCTION

USER GUIDE

This book contains guidance to participants in EPA's construction grants program. It provides information and suggested procedures to help communities successfully plan and design municipal sewage treatment works, and to construct them with Federal financial support. Because this book is in fact guidance, the recommendations it presents are discretionary with each program participant.

Of course, a major purpose of this volume is to help communities seeking or managing a construction grant to comply with all program requirements contained in Federal regulation. Therefore, for continuity and clarity, we have summarized those regulatory requirements at appropriate points within the text. To identify them as mandatory, we have employed such wording as "must" and "will," and highlighted them by means of a bar in the left margin. Because these statements are merely summaries, however, the reader should not rely upon them as a substitute for the regulations themselves, as contained in the Code of Federal Regulation.

This book contains guidance from the preplanning stage to completion of construction and initial operation of the treatment works. It is divided into four major parts (planning, design, construction, and financial/procurement). You may need to review only those parts which correspond to the present stage of development of your project.

Over two-thirds of the municipalities which have received Federal grant assistance from EPA for the construction of treatment works have a population under 10,000. In most of these municipalities, the governing body is not full-time nor in many cases is there a full-time municipal administrator. We recognize that water pollution abatement is not your only municipal concern.

Reference to Federal Regulations

References to regulations in this book are made by citing specific portions of the Code of Federal Regulations (CFR). Virtually all regulations applicable to the construction grants program are contained in Title 40 -- Protection of Environment. Title 40, in turn, is broken into parts, sections, and subsections. For example, 35.2108 means (Title 40) Part 35, section 2108.

When other titles of the CFR are cited, they will include the title numbers before the letters CFR followed by the part, section, and subsection. Therefore, 10 CFR 2.7-3 means Title 10 -- Energy, Part 2, section 7, subsection 3.

At times it is necessary to cite material published in the Federal Register. This reference will be shown as 45 FR 2186 which means Volume 45, Federal Register, page 2186. When reference is made to a law, the common name is generally used followed by letters and numbers. For example, the Clean Water Act of 1977 is the common name and PL 95-217 means Public Law, 95th Congress, 217th law enacted by that Congress.

1981 Amendments to the Clean Water Act

The Municipal Wastewater Treatment Construction Grants Amendments of 1981, and changed significantly the procedural and administrative aspects of the municipal construction grants program as they apply to grants made after that date. Detailed implications of these changes are contained in the regulations and are incorporated throughout this book. For easy reference, the changes are highlighted in Appendix L.

Terminology

The terminology used in this book is defined in the regulations in 40 CFR Parts 30, 33, or 35. Although separate Federal grants are no longer provided for facilities planning and design of projects, the previous designation of these activities as Step 1, facilities planning, and Step 2, design, will be retained because of their common usage and understanding. The term Step 3 grant refers to building of the project for which grant assistance will be awarded. The term Step 2+3 grant is to be understood to include a Step 3 grant award which includes an allowance (percentage of the cost of building the project) for design activities. Normally, Step 3 grant assistance will include an allowance for the planning and design activities.

The term "advance" refers to the Federal funds provided to small communities that, in the opinion of the State, would not be able to complete the application requirements (facilities planning and design) without such an advance. If Step 3 grant assistance is eventually awarded, the advance will be subtracted from the allowance.

Projects that received a Step 1 and/or Step 2 grant prior to the enactment of the 1981 amendments to the Clean Water Act should be completed in accordance with the terms and conditions of their grant agreement. Step 3 grant assistance will include an allowance for design for those projects that received a Step 1 grant prior to December 29, 1981. However, no allowance for facilities planning and design will be included in a Step 3 grant for projects that received a Step 2 grant prior to December 29, 1981.

As used in this book, the term "project reviewer" means a State employee reviewing your project in a State that has been delegated responsibility for administration of the construction grants program or an EPA employee reviewing the project in a nondelegated State. The term "reviewing agency" means the State water pollution control agency or, in a few instances, EPA.

Other Guidance

The text incorporates Federal regulatory requirements and, at times, refers to other EPA guidance publications. The referenced guidance publications are generally technical (e.g., design criteria for land application systems) and provide much greater detail than required for this book. Additional State requirements, if any, will be provided by your project reviewer.

Appendixes

Appendixes in this book contain helpful information such as a listing of applicable EPA technical publications, construction grants and procurement regulations, technical design or evaluation criteria, etc. Copies of the publications listed in Appendix B may be obtained from your reviewing agency or from the address listed in the appendix.

Multiple quantities may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

MANAGING YOUR PROJECT

Introduction

This section is intended to assist you in managing your project. It provides a description of the basic objective of the Clean Water Act, provides a summary of the construction grants program including an expanded discussion of the 1981 amendments, discusses State delegation, your project team, and other topics that will be of assistance in managing your project from inception through construction and operation. Figure 1 represents the organization of CG-82 and the flow of activities during the grants process. A listing of major activities in the construction grants program is provided at the end of this introduction.

Clean Water Act

The objective of the Clean Water Act (CWA) as amended in 1981 is "...to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." This objective is to be achieved in part by:

o Development of water quality standards and the regulations necessary to enforce them;

o Formulation of State and areawide water quality management plans including comprehensive analysis of the actions necessary to meet the water quality standards;

o Issuance of permits for the discharge of all pollutants to all point sources--industrial, municipal, and other facilities--that release pollutants from pipes, sewers, or other confined outfalls; and

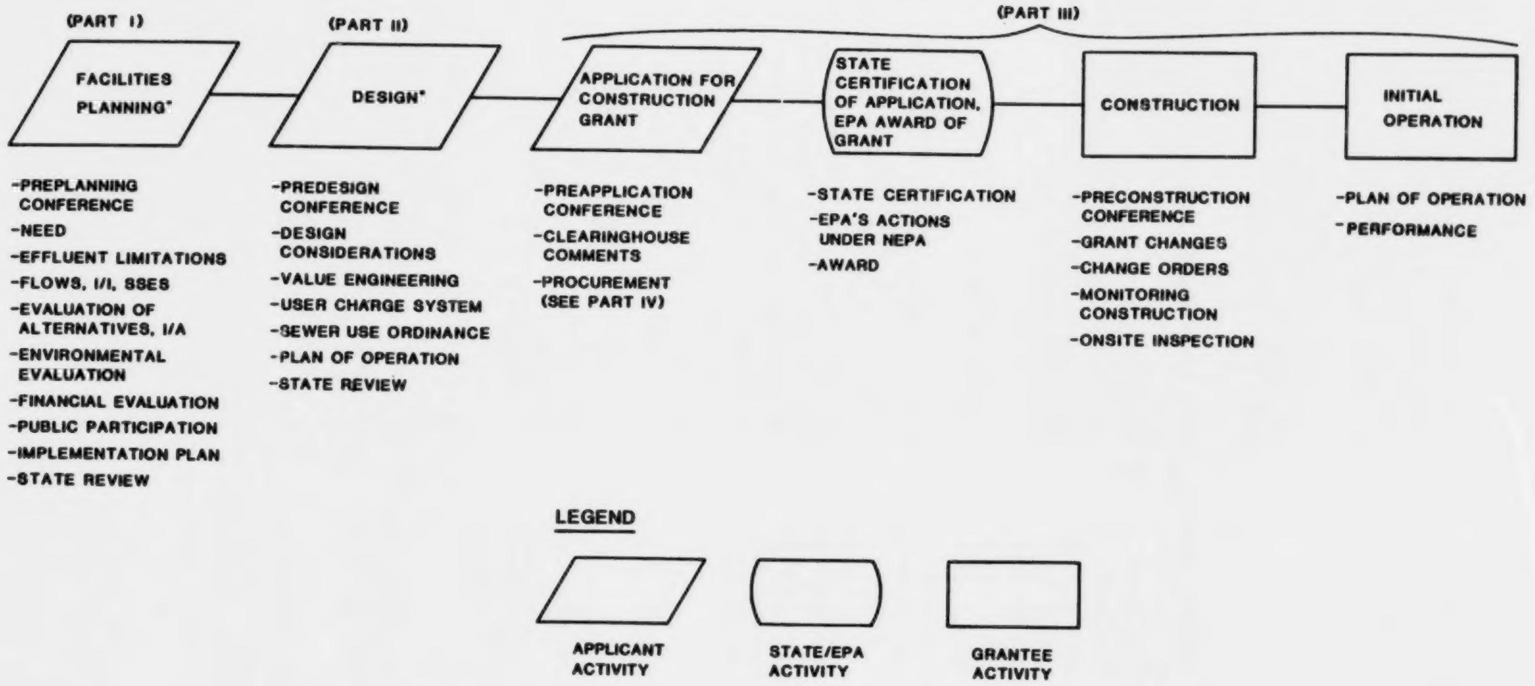
o Provision for Federal funds to assist in the construction of municipal wastewater treatment works.

The reviewing agency will work with you so that your project satisfies the requirements of the CWA, its implementing regulations, and other applicable Federal and State laws and executive orders (EO).

Grants Program

EPA is authorized under the CWA, as amended, to provide grant assistance to municipalities for the building of wastewater treatment projects. EPA grant assistance may be up to 75 percent of the allowable costs of building the project and include an allowance for facilities planning and design. After October 1, 1984, the Federal share will be 55 percent of these costs. Innovative and alternative (I&A) technology projects may receive an additional 20 percent Federal share, up to a maximum of 85 percent.

Eligible projects include collection systems, intercepting sewers, wastewater treatment facilities, outfall sewers, infiltration/inflow (I/I) rehabilitation and correction of combined sewer overflows. After October 1, 1984, eligible projects include only intercepting sewers, wastewater treatment facilities, outfall sewers and I/I rehabilitation, except that the Governor of a State may elect to use up to 20 percent of a State's allotment for previously eligible projects.


(PART I)
(PART II)
(PART III)
FACILITIES PLANNING*
DESIGN*
APPLICATION FOR CONSTRUCTION GRANT
STATE CERTIFICATION OF APPLICATION, EPA AWARD OF GRANT
CONSTRUCTION
INITIAL OPERATION
-PREPLANNING CONFERENCE
-NEED
-EFFLUENT LIMITATIONS
-FLOWS, I/I, SSES
-EVALUATION OF ALTERNATIVES, I/A
-ENVIRONMENTAL EVALUATION
-FINANCIAL EVALUATION
-PUBLIC PARTICIPATION
-IMPLEMENTATION PLAN
-STATE REVIEW
-PREDESIGN CONFERENCE
-DESIGN CONSIDERATIONS
-VALUE ENGINEERING
-USER CHARGE SYSTEM
-SEWER USE ORDINANCE
-PLAN OF OPERATION
-STATE REVIEW
-PREAPPLICATION CONFERENCE
-CLEARINGHOUSE COMMENTS
-PROCUREMENT (SEE PART IV)
-STATE CERTIFICATION
-EPA'S ACTIONS UNDER NEPA
-AWARD
-PRECONSTRUCTION CONFERENCE
-GRANT CHANGES
-CHANGE ORDERS
-MONITORING CONSTRUCTION
-ONSITE INSPECTION
-PLAN OF OPERATION
-PERFORMANCE
LEGEND
APPLICANT ACTIVITY
STATE/EPA ACTIVITY
GRANTEE ACTIVITY

(PART I) = PORTION OF CONSTRUCTION GRANTS 1982

* THE STATE MAY ADVANCE FUNDS FOR PLANNING AND DESIGN FOR SMALL COMMUNITIES THAT WOULD OTHERWISE BE UNABLE TO PREPARE A REQUEST FOR A GRANT.

FIGURE 1. CONSTRUCTION GRANTS PROCESS

Project development may best be considered as a three-step process.

- Step 1--facilities planning to determine the type and extent of project you should build.

- Step 2--project design including the preparation of construction drawings, specifications, and other contract documents.

- Step 3--project construction for which EPA grant assistance is awarded.

The construction grants regulations also allow other types of financial assistance under certain circumstances. For example:

- Step 2+3--available to municipalities with a population of 25,000 or less and with projects costing $8 million or less; the grant agreement will include an allowance for design; 30 percent of the allowance will be paid upon grant award, half the remaining when design is 50 percent complete, and the balance with the first payment after award of a subagreement for building the project;

- Advance funding--financial assistance provided to a small community that in the judgement of the State would otherwise be unable to prepare a request for a construction grant; advance funds so provided are based on an allowance of costs to prepare a facilities plan and construction drawings, specifications, and other contract documents; the advance will be subtracted from any subsequent grant or may be recovered by the State agency if no grant is made.

After the Federal government appropriates funds for the grants program, based on a formula set by law, EPA allots the money among the States. Each State, in turn, prepares a list of all projects to be funded and ranks the projects in order of their importance. The resulting list is called the State project priority list. Your project must be sufficiently high on the list and be within the fundable range for any given fiscal year in order for you to obtain a grant.

Your application for grant assistance, including supporting documents, is submitted to your State agency. It reviews the application, and if the State has sufficient funds, it certifies your project and sends the application to EPA. EPA makes a grant offer (within 45 days of your project certification in delegated States) and, after your acceptance, you may begin the procurement procedures necessary to build the project.

The grant award sets aside (obligates) funds for your project. You request payments from EPA during construction as costs are incurred. Payment of your facilities planning and design allowance will be included with your first construction payment. Advance payment of building costs is generally not allowed.

Your Step 3 project costs are subject to audit by the Federal government; therefore, you should keep adequate records (Section 15.5.1).

Project Management and State Delegation

The single most important task of a municipal official with regard to a wastewater project is to manage the project to ensure its timely and economical completion. This entails bringing people together to select the most appropriate technology, to work on the project, making financial arrangements to pay the local share, obtaining a Federal and possibly a State grant or loan to help pay the costs, managing the cash flow of all funds, and moving the project through development and the grants process with a minimum of delay.

State Contact

In order to eliminate duplicate reviews of project documents, EPA is well along in the process of delegating the management and administration of the construction grants program to the States. The extent of delegation varies from State to State; you should check with your project reviewer to determine how this may affect you.

You should first contact your State reviewing agency to obtain information and an application package. Also, if you have not already done so, request information as to how to become listed on the State project priority list.

Organizing the Project Team

To make a project run as smoothly as possible, you will need a project team. The team should consist of:

Municipal project manager
Architect/Engineer
Accountant/Financial Advisor
Attorney
Construction contractor
Treatment plant operator

o Municipal Project Manager

The municipal project manager oversees whatever is necessary to keep the project moving. His primary responsibility is to maintain control over the progress of the project and ensure that everyone is doing his job on time. Ideally, the municipal project manager is a full-time municipal employee with experience in dealing with regulatory agencies and Federal grants.

The municipal project manager will need to keep excellent records including a telephone log and a followup system to ensure that nothing is overlooked. He will locate and identify the project reviewer for your project in the State agency and possibly EPA as well. Keep the project reviewers informed of your progress and forewarn them of decisions they will have to make in the near future. If the project reviewer changes, it may be beneficial to arrange a meeting to bring the new project reviewer up to date on the current status of the project.

o Architect/Engineer

The selection of a competent, experienced architect/engineer (A/E) is perhaps the most important decision you will make to ensure that your project is done correctly, on time, and satisfies all applicable State and Federal laws. In most cases, an A/E will do most of the work in the planning and design phases of your project and may provide other services during construction. The A/E's primary responsibilities prior to grant application are to complete the technical portions of the facilities plan, prepare and coordinate the design, prepare the construction drawings, specifications and contract documents, estimate project costs, prepare other reports which may be necessary, and provide you with professional engineering advice.

Other A/E services may include value engineering (VE) or construction management. A VE review is required for projects with estimated building costs exceeding $10 million. Construction management services, while optional, may provide specialized skills to ensure efficient and timely construction. Firms specializing in construction management are best hired as early as possible, preferably during the planning phase, so that you can realize the maximum benefit from their services. A construction management firm can help you control project costs, completion time, and quality construction. Typical construction management services include developing, monitoring, and updating the project budget and schedule; reviewing A/E and construction contractor staffing plans to insure that adequate manpower will be used to enable the project to stay on schedule; providing inputs to the A/E on construction phasing, trade practices, and the suitability and availability of various construction materials; making recommendations concerning bid packaging to increase competition; expediting delivery of equipment which you are purchasing directly; and inspecting construction to insure conformance with the specifications. Despite the A/E's role, it is your municipality's project and you are responsible for proper management of the project.

o Accountant/Financial Advisor

Since you will be using Federal funds to build your project and are therefore subject to Federal audit of your Step 3 project costs, it is essential to maintain accurate and detailed accounts. Incomplete or inaccurate accounts can lead to the loss of part of your grant, placing an undue financial burden on your community. To maintain financial records, you may use your municipal treasurer or a private accounting firm. The accountant should keep separate ledgers for the EPA project, identify allowable and unallowable costs, maintain vouchers for all costs incurred, and employ generally accepted accounting practices.

In addition to maintaining financial records, your community's financial advisor can help you assess the financial capability of your residents and community to afford the project and help decide how to proceed.

The accountant should make an appointment with the project reviewer to discuss the type and detail of records to be maintained. An EPA publication entitled "Accounting Guide for Construction Grants" and Appendix A to the EPA regulations 40 CFR Part 35 will be helpful to your accountant.

o Attorney

You will need the assistance of an attorney in procuring goods and services (e.g., construction contractors), completing the application, and acquiring property, easements or rights-of-way. Your municipal attorney should be able to provide these services.

o Construction Contractor

The construction contractor's responsibilities will be defined in the contract documents accompanying the construction drawings and specifications prepared by your A/E firm. Construction contractors will be selected through competitive bidding and will play an important role as part of your project team.

- Treatment Plant Operator

Your treatment plant operator should be included in your project team at the earliest possible time. He may offer suggestions during design to ensure efficient operation and maintenance or make other operational recommendations such as staffing or training. During construction your operator will have an opportunity to observe and note location of underground structures or piping which may be of assistance later should operational problems occur.

Funding Local Share

EPA will provide a grant to eligible municipalities of up to 75 percent until October 1, 1984, and 55 percent thereafter of the allowable project costs. The Federal grant share may be increased by an additional 20 percent for innovative or alternative technology projects but in no case exceed 85 percent. Your State may also provide a State grant; however, you must raise the remaining local share of the project costs.

It may be possible to obtain grants, loans, or loan guarantees from other Federal agencies provided that the laws administered by these agencies allow their grant funds to be used for this specific purpose. In the case of qualified areas, the Farmers Home Administration may be able to help you fund the costs unallowed by EPA. Another possible source of funds could be the Department of Housing and Urban Development. For further information contact your project reviewer. After you have exhausted all possible sources of funds, arrange to raise the remaining local share by, for example, selling bonds, using general revenue funds or revenue anticipation notes, or using special funds earmarked for your wastewater project.

Intermunicipal Service Agreements

Many projects involve more than one municipality, and it is sometimes difficult to come to agreement with all of the jurisdictions involved. During your facilities planning activities you should have reached agreement with the other jurisdictions with regard to cost sharing, operation and maintenance responsibilities of each party, enactment of ordinances concerning sewer use and user charges, and any other legally binding procedures necessary for implementing the project. While you are not required to execute intermunicipal service agreements at the completion of facilities planning, it may be prudent to do so or at least have a meeting of the minds as reflected in a written agreement.

Your reviewing agency may exercise discretion with regard to the stage of development or the execution of intermunicipal service agreements for Step 2+3 projects or projects which receive advance funding. The decision will be made on a case-by-case basis depending on the complexity of the project.

Executed intermunicipal service agreements generally are required with the Step 3 application for grant assistance or before initiation of procurement action for building the project on a Step 2+3 project. Therefore, you should consider starting early to negotiate agreements and, if at all possible, have a written agreement before beginning work on the design of your project.

Avoiding Project Delay

In addition to the items discussed above, several other issues require special attention in order to preclude project delays. The list below briefly describes common issues which cause project delays and often result in avoidable hardships to municipalities. These issues are each addressed in later sections of this book but are highlighted here as an early warning to project managers.

o Project Responsibility - Although the EPA grant may represent up to 85 percent of the allowable project costs and substantial work may be performed by your contractors (e.g., A/E or construction contractors), you are responsible for the successful management and completion of your project including operation and maintenance (O&M) during the life of the project necessary to meet your National Pollutant Discharge Elimination System (NPDES) permit requirements. Section V of the grant application entitled "Assurances" sets forth your responsibilities once the grant is accepted and should be reviewed carefully.

o Project Cost - Due to the time interval between completion of your facilities plan, the design of your project, and the application for grant assistance, the estimated costs of your project and your local share may have increased. This is especially true recognizing the reduced Federal grant share after October 1, 1984. You should periodically revise and review the local cost share of your project and compare these cost estimates with your community's current financial status to ensure that the project is realistic in terms of the financial capability of your community.

o Documentation of Costs - The Step 3 phase of your project is subject to Federal audit which, in turn, requires documentation of project costs in order for these costs to remain allowable for grant participation. For example, administrative costs for municipal employees must be substantiated by time sheets. Other costs should be substantiated by invoices, and in the case of construction change orders, be supported by written minutes of negotiation. While only Step 3 grant costs are subject to Federal audit (i.e., costs incurred prior to grant award are excluded from Federal audit), it is good practice to develop and maintain an accounting and filing system which provides an audit trail from project initiation through completion.

o O&M Costs - As project costs are periodically revised and as a plan of operation is developed, you should carefully review the operation, maintenance and replacement cost estimates. Historically, too many projects have underestimated these costs only to find later that they are higher than anticipated. Your reviewing agency may be able to provide you with experiences from other municipalities that will help guide you as to the reasonableness of your costs.

o Environmental Review - The environmental review is to be completed before submission of your application. You should work with the State and EPA as early as possible in the facilities planning process to determine the appropriateness of the Categorical Exclusion, a Finding of No Significant Impact, or an Environmental Impact Statement. You may request in writing that EPA make a formal determination.

FIGURE A
MAJOR ACTIVITIES IN THE CONSTRUCTION GRANTS PROGRAM

		Submit to	
Action	Regulation	State	EPA
A. File notice of intent	30.305-8	X	
B. Request advance (optional)	35.2025(b)	X	
C. Request Environmental Scoping (optional)	35.2113 35.2030(c)	X	X
D. Facilities Plan			
- Existing environment (no action alt)	6.507		
- Effluent requirements	35.2030(b)(2)		
- I/I analysis (if applicable)	35.2030(b)(4)		
- Alternative evaluation	35.2030(b)(3)		
- Open space and recreation evaluation	35.2030(b)(5)		
- Environmental evaluation	35.2030(b)(6)		
- Public participation	6.504 35.2040		
- Meet requirements of all other laws	30.405		
- CSO need & benefits (if applicable)	35.2024		
- Selected alternative	35.2030(b)(1)&(7)		
- Complete waste treatment system	35.2030(b)(1)		
- Applicant's financial (etc.) capability	35.2104(b)		
- Consistency with WQM plan	35.2102		
E. Project Design			
- Value Engineering	35.2114		
- User Charge System	35.2140		
- Sewer Use Ordinance	35.2130		
- Plan of Operation	35.2106		
- O&M Manual	35.2206		
- Intermunicipal Services Agreements	35.2107		
F. Clearinghouse Comments	35.2040	X	
- Compliance with Limitations on Award	35.2100	X	
G. Final Design and Specifications and the project schedule	35.2040	X	
H. Grant Application (D thru G)	35.2040		
I. State Certification	35.2042		
J. State Preliminary Env. Assess	6.507		
K. State submit Grant Application Package (D thru K)	35.2042		X
- Procurement	40 CFR 33	X	
- Project changes	35.2204	X	
- Project Performance	35.2214	X	
- Notice of Building Completion and Final Inspection	35.2216	X	

PART I. FACILITIES PLANNING

CHAPTER 1

FACILITIES PLANNING-- PURPOSE AND CONTENT

1.0 AMENDMENTS OF 1981

The Municipal Wastewater Treatment Construction Grants Amendments of 1981 (PL 97-117) changed the CWA with regard to facilities planning and design. While separate grants for facilities planning and design will no longer be made, at the time of Step 3 grant award, an allowance will be included in the grant for these activities. Your municipality may be eligible, however, to receive an advance of the allowance for planning and/or design of your project if your State reviewing agency determines that you would otherwise be unable to prepare a request, i.e., facilities plan and design to qualify for grant assistance. State reviewing agencies will provide up to 10 percent of their annual construction grant funding allotment for advances and will determine the terms and conditions for seeking repayment if a construction grant is not made at some point in the future.

Those communities that received a facilities planning grant or design grant prior to December 29, 1981, will complete their project according to the grant agreement and any special conditions attached to it. At the completion of these projects, municipalities will then follow the current grant application process.

During facilities planning you should anticipate the provisions of the 1981 amendments that become effective on October 1, 1984. These provisions are discussed throughout this book and include Federal grant share, reserve capacity and eligible project categories.

The impact of these provisions will be reflected in the local share of project costs to be borne by your municipality. It requires that you carefully prepare your project schedule, periodically revise it as necessary, and remain in close contact with your reviewing agency in order to anticipate the timing of your grant.

Eliminating separate Step 1 and Step 2 grants will allow your community to move more rapidly in the preparation of your grant application. This may result in reduced project costs due to the impacts of inflation on construction. In addition, you no longer have to prepare three separate applications. These changes are intended to enable you to build your project sooner, resulting in earlier water pollution abatement.

You should note that the technical requirements for facilities planning and project design have not changed under the 1981 amendments (the exception is allowable costs for reserve capacity after December 29, 1981). You will need to complete a facilities plan and meet other Federal requirements. Therefore, you are encouraged to follow the guidance in this book and seek the review by your reviewing agency of your facilities plan both during and after its completion. It is also recommended that you request the review of your project design at intermediate points and at completion to ensure compliance with both State and Federal requirements. By maintaining contact with your project reviewer and ensuring that your project meets all of the applicable requirements, you will avoid potential delays at the time of grant application.

1.1
FACILITIES PLANNING--PURPOSE AND DEFINITION

The facilities planning process is the first major step leading to award of grant assistance. Facilities planning consists of those necessary plans and studies that directly relate to the construction of treatment works needed to comply with the enforceable requirements of the Act. Facilities planning is a process of evaluating alternative solutions, and through systematic screening and evaluation, selecting the alternative which is the most cost effective, i.e., is the most economical means of meeting water quality or public health requirements over the useful life of the facilities while recognizing environmental and other nonmonetary considerations. The facilities plan also demonstrates that the selected plan can be carried out from legal, institutional, financial, and management standpoints. A flow chart (Figure 2) illustrates the principal stages of the facilities planning process. Each major stage corresponds to a chapter in Part I of this book.

The facilities plan is your record of why the selected treatment system best meets your needs. The selection of the best wastewater management alternative is the most important outcome of the facilities planning process. The plan, therefore, should present a clear picture of how this decision was reached.

It also will enable your project reviewer to assure compliance with applicable regulations.

1.2
CONTENTS OF FACILITIES PLAN

Include the following in your facilities plan.

o A description of both the proposed treatment works and the complete waste treatment system of which it is a part (Section 5.2).

o A description of the Best Practicable Wastewater Treatment Technology (BPWTT) (Section 6.4).

o A cost-effectiveness analysis of the feasible conventional, innovative and alternative wastewater treatment works, processes and techniques capable of meeting the applicable Federal, State and local effluent and water quality requirements. The monetary costs to be considered include the present worth or equivalent annual value of all capital costs and operation, maintenance and replacement costs. The population forecasting in the analysis is the disaggregation of the State developed population projection. A cost-effectiveness analysis includes:

- An evaluation of alternative flow reduction methods (Section 5.5.3);
- A description of the relationship between the capacity of alternatives and the needs to be served, including capacity for future growth expected after the treatment works becomes operational (Section 5.5.2);
- An evaluation of improved effluent quality attainable by upgrading the operation and maintenance and efficiency of existing facilities as an alternative or supplement to building of new facilities (Section 6.0);

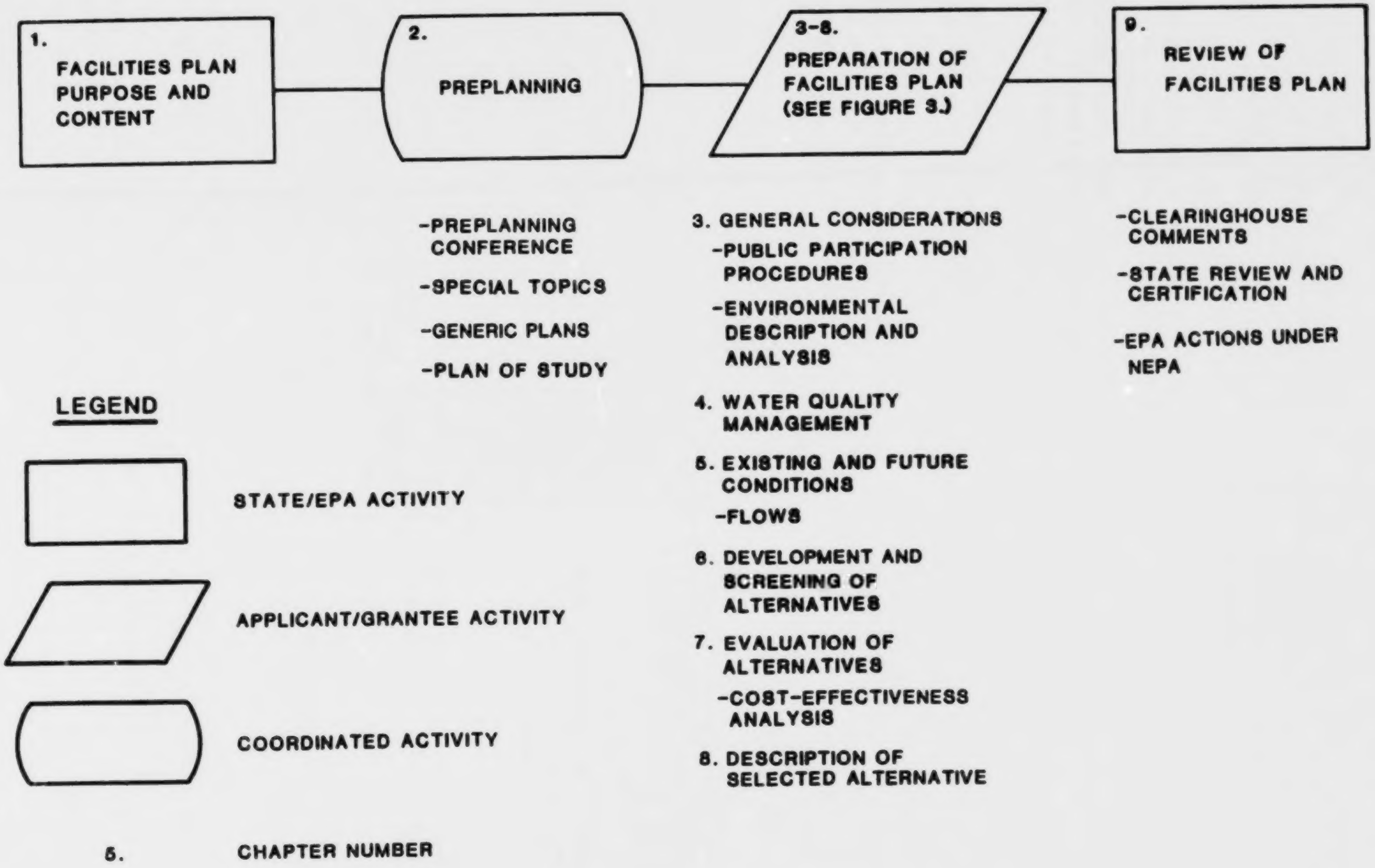

1.
FACILITIES PLAN PURPOSE AND CONTENT
2.
PREPLANNING
3-8.
PREPARATION OF FACILITIES PLAN (SEE FIGURE 3.)
9.
REVIEW OF FACILITIES PLAN
-PREPLANNING CONFERENCE
-SPECIAL TOPICS
-GENERIC PLANS
-PLAN OF STUDY
3. GENERAL CONSIDERATIONS
-PUBLIC PARTICIPATION PROCEDURES
-ENVIRONMENTAL DESCRIPTION AND ANALYSIS
4. WATER QUALITY MANAGEMENT
5. EXISTING AND FUTURE CONDITIONS
-FLOWS
6. DEVELOPMENT AND SCREENING OF ALTERNATIVES
7. EVALUATION OF ALTERNATIVES
-COST-EFFECTIVENESS ANALYSIS
8. DESCRIPTION OF SELECTED ALTERNATIVE
-CLEARINGHOUSE COMMENTS
-STATE REVIEW AND CERTIFICATION
-EPA ACTIONS UNDER NEPA
LEGEND
STATE/EPA ACTIVITY
APPLICANT/GRANTEE ACTIVITY
COORDINATED ACTIVITY
5.
CHAPTER NUMBER

FIGURE 2. PROCEDURAL FLOW CHART FOR FACILITIES PLANNING

- An evaluation of the alternative methods for the reuse or ultimate disposal of treated wastewater and sludge material resulting from the treatment process (Section 6.6);

- Consideration of systems with revenue generating applications (Section 6.4);

- An evaluation of opportunities to reduce use of or recover energy (Section 6.4.1); and

- Cost information on total capital costs, and annual operation, maintenance and replacement costs, as well as estimated annual or monthly costs to residential and industrial users (Section 7.2).

o A demonstration of the non-existence or possible existence of excessive I/I in an existing sewer system (Section 5.4).

o An analysis of the potential open space and recreation opportunities associated with the project (Section 7.8).

o An adequate evaluation of the environmental impacts of alternatives (Section 7.4).

o For the selected alternative, a concise description at an appropriate level of detail of at least the following:

- Estimated capital construction and O&M costs (identifying the Federal, State, and local shares) and a description of the manner in which the local costs will be financed (Section 8.2);

- Estimated cost of future expansion and long-term needs for reconstruction of facilities following their useful life (Section 7.3);

- Cost impacts on wastewater system users (Section 7.2); and

- Institutional and management arrangements necessary for successful implementation (Section 8.5.1).

o A description of a municipal pretreatment program if applicable (Section 8.5.4).

o A demonstration that the selected alternative is consistent with any applicable approved water quality management (WQM) plan (Section 4.0).

o A demonstration that the municipality has the legal, institutional, managerial and financial capability to ensure adequate construction and operation and maintenance of the treatment works throughout the project's service area including the ability to comply with 40 CFR 35.405 and 30.340-2; this later section of the regulations not only addresses financial and management capabilities but includes compliance with the Civil Rights Act of 1964, equal employment opportunity and labor laws (Section 8.5).

o Comments of relevant State, interstate, regional and local agencies (Section 13.1.1).

o A summary of public participation in the development of the facilities plan (Section 3.1.1).

If any of the above information has been developed separately from the facilities plan, it may be incorporated by reference rather than duplicated, although documentation of each item is necessary in your completed plan.

Normally, facilities planning for the entire project area is completed before design or before Step 3 grant assistance is awarded; however, the reviewing agency may provide grant assistance for a segment or phase of the project if:

- o The project segment or phase satisfies the provisions of the National Environmental Policy Act (NEPA) (Section 9.2.2);
- o Facilities planning related to the project has been substantially completed and the project for which grant assistance is awarded will not be significantly affected by the completion of the facilities plan;
- o The project segment will be a component part of the complete system meeting the enforceable requirements of the CWA;
- o You agree to complete the facilities plan and treatment works on a schedule specified in the grant agreement whether grant funding is available for the remaining segments; and
- o The cost of building the treatment works would consume a major portion of the State's annual allotment; or
- o The period to complete the building of the treatment works will cover three years or more; or
- o A Federal or State court order requires that the treatment works be segmented.

CHAPTER 2

PREPLANNING

2.0 PREPLANNING CONFERENCE

Chapter 1 discusses the purpose and content of facilities plans as well as the 1981 amendments to the CWA. It is evident that preplanning should precede the preparation of a facilities plan in order to assure that costs, schedules and scope of work performed during facilities planning are adequate to satisfy regulatory requirements and are commensurate with complexity of the water pollution problems. Preplanning assistance, including a preplanning conference with your reviewing agency, is strongly encouraged. In some cases, the recommended conference will be held after facilities planning has begun but before it has progressed substantially.

Generally, the project reviewer will contact you when your project has been placed on the State's project priority list and provide appropriate guidance materials. At the State's or your request, you may wish to schedule a preplanning conference at which you, other municipal officials and possibly your A/E will meet with the project reviewer to discuss various elements of the construction grants program. While a conference may not be possible for every project, you are entitled to assistance and explanations by the project reviewer before or soon after you initiate activities leading up to grant assistance.

At the conference, requirements for grant assistance and issues relevant or unique to your project will be reviewed and addressed. For example:

- o For small communities, an advance of funds for planning and design and the use of a simplified generic facilities plan;
- o For sewered communities with a population of 10,000 or less, consideration for use of at least facultative ponds, trickling filters or overland flow land treatment; for unsewered communities of 10,000 or less, consideration of onsite systems; and
- o Estimated charges to customers and the impact of those charges in terms of median household income (Section 7.2) as well as your community's financial capability and arrangements for financing the local share of project costs (Section 12.7).

In addition, you may request an early determination of the scope of the environmental review including eligibility for Categorical Exclusion, preparation of an Environmental Information Document (EID), a Finding of No Significant Impact (FNSI) or concurrent development of an Environmental Impact Statement (EIS), i.e., piggybacking (Section 9.2.2).

2.1 ELIGIBLE APPLICANT

A municipality will be eligible for grant assistance if it meets the following requirements at the time of application:

- o Is a public body created under State law having as one of its principal responsibilities the treatment, transport or disposal of liquid wastes of the general public in a particular geographic area;
- o Is a designated and approved management agency authorized in a WQM plan; and
- o Demonstrates the legal authority and financial capability to build and manage the resulting treatment works.

If two or more political jurisdictions are included in the facilities planning area, the eventual grant applicant may be a joint authority that represents all the jurisdictions or a designated lead agency. In these cases, carrying out the approved facilities plan will be based on written intermunicipal service agreement between the public bodies. Projects involving more than one municipality should meet to discuss their interrelationships and resolve differences before the application process begins.

2.2 PLAN OF STUDY

While not required, it may be very helpful for you to prepare a plan of study for your project. A plan of study can help ensure that you, your A/E firm and the reviewing agency have a common understanding of the scope, schedule and costs of preparing the facilities plan. Ideally, the plan of study should be prepared prior to the preplanning conference and serve as the basis for discussion. Suggested items to be included in the plan of study include a description of the work tasks to be performed resulting in the completion of an approvable facilities plan, a schedule for completion of work tasks and outputs, and an estimate of manhours and costs to complete work tasks.

2.3 CLEARINGHOUSE COMMENTS

Most States have one or more agencies that act as an areawide clearinghouse for all projects within a specific geographical area. At an early stage of development of your project, you are encouraged to establish contact with the clearinghouse to obtain comments that will indicate the degree of interest or concern other agencies have in your project. You should review any comments received to identify sensitive issues for evaluation in your facilities plan. Office of Management and Budget (OMB) Circular A-95 requires the inclusion or approvals of relevant State, local or Federal agencies as part of your application for grant assistance.

2.4 PROCUREMENT OF SERVICES

Most municipalities find it necessary to procure professional services (e.g., A/E firm) to assist them in the preparation of a facilities plan and project design. Step 3 grant assistance will include an allowance for facilities planning and project design. Among other things, the allowance takes into account the cost of professional services required for these activities. Because EPA will not reimburse you for your actual costs, but rather provides an allowance, you need not comply with the provisions of EPA's procurement regulations (40 CFR Part 33) for procuring these services; however, you will need to comply with the provisions during the building of the project or certify that your own procurement system at a minimum satisfies the provisions.

The procurement of services during the early stages of your project is solely your responsibility. EPA suggests that you give careful consideration to the procurement procedures you will use and, lacking your own system, consider using 40 CFR Part 33. A discussion of procurement is included in Chapter 16.

CHAPTER 3

FACILITIES PLANNING CONSIDERATIONS

3.0 GENERAL PREPARATION PROCEDURES

Figure 3 is a flow chart that illustrates the preparation of a facilities plan. The chart relates Chapters 4 through 8 of this book to the overall facilities planning process illustrated by Figure 2 in Chapter 1.

Figure 3 graphically indicates how public participation and environmental evaluation are integrated throughout the development of the facilities plan. To reduce duplication in this book, public participation and environmental evaluation are described in this chapter. Subsequent chapters refer to these descriptions as appropriate.

Maintaining the interrelationship among evaluation of alternatives, environmental evaluation and public participation will ensure that issues critical to the identification of the most cost-effective alternative such as financial and environmental impacts, treatment processes, siting of facilities, etc., will be addressed thoroughly during facilities planning. Your schedule of work should include a periodic review of these interrelationships with your project reviewer to ensure that they are maintained throughout the facilities planning process.

3.1 PUBLIC PARTICIPATION

Open discussion and citizen involvement can help you develop plans that reflect the needs and values of your community. Informing the public early about the scope and nature of the facilities planning and involving them during development and evaluation of alternatives can surface important facts and identify issues early, so they can be resolved without unnecessary delay or additional cost. Even more important, a better, less costly project may result. The understanding gained for the project and its costs during meetings and by reading fact sheets can help develop citizen support for the bonds and user charge system needed to fund the project and help assure the revenues needed later for operation of the facility.

Public participation required in connection with state and local statutes and with the environmental review process under Part 6 should be coordinated with your facilities planning public participation program wherever possible.

You are not required to use EPA's Part 25 public participation regulations in facilities planning; however, you may wish to review Part 25 for suggestions for your program, such as, you should:

o Inform your community's residents near the start of the facilities planning process when assessing problems and of developments throughout the facilities planning process;

o Provide your project reviewer and the public with a brief public participation work plan. The work plan describes how public participation will be conducted, encouraged and assisted during facilities planning. It includes staffing plans, a budget, schedule of activities, points of consultation and preparation of responsiveness summaries, consultation and information distribution mechanisms, and an identification of

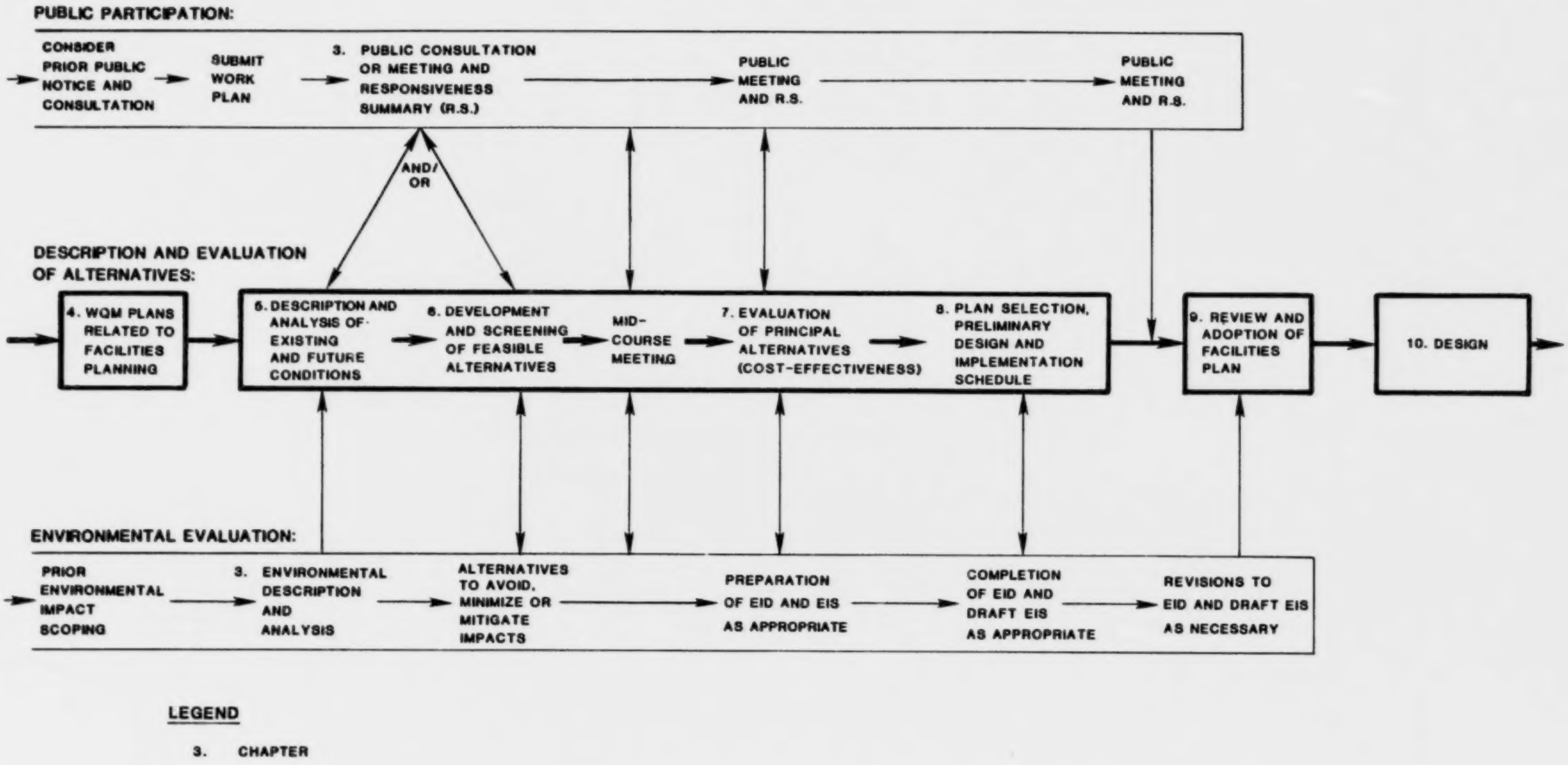

PUBLIC PARTICIPATION:
CONSIDER PRIOR PUBLIC NOTICE AND CONSULTATION
SUBMIT WORK PLAN
3. PUBLIC CONSULTATION OR MEETING AND RESPONSIVENESS SUMMARY (R.S.)
PUBLIC MEETING AND R.S.
PUBLIC MEETING AND R.S.
AND/OR
DESCRIPTION AND EVALUATION OF ALTERNATIVES:
4. WQM PLANS RELATED TO FACILITIES PLANNING
5. DESCRIPTION AND ANALYSIS OF EXISTING AND FUTURE CONDITIONS
6. DEVELOPMENT AND SCREENING OF FEASIBLE ALTERNATIVES
MID-COURSE MEETING
7. EVALUATION OF PRINCIPAL ALTERNATIVES (COST-EFFECTIVENESS)
8. PLAN SELECTION, PRELIMINARY DESIGN AND IMPLEMENTATION SCHEDULE
9. REVIEW AND ADOPTION OF FACILITIES PLAN
10. DESIGN
ENVIRONMENTAL EVALUATION:
PRIOR ENVIRONMENTAL IMPACT SCOPING
3. ENVIRONMENTAL DESCRIPTION AND ANALYSIS
ALTERNATIVES TO AVOID, MINIMIZE OR MITIGATE IMPACTS
PREPARATION OF EID AND EIS AS APPROPRIATE
COMPLETION OF EID AND DRAFT EIS AS APPROPRIATE
REVISIONS TO EID AND DRAFT EIS AS NECESSARY
LEGEND
3. CHAPTER

FIGURE 3. GENERAL FACILITIES PLAN PREPARATION PROCEDURES (Detail of FIGURE 2.).

segments of the public to be reached for participation. The work plan and other information can be made available through the use of existing local information channels if widely read, such as town bulletin boards, or notices in the library. Further savings for small communities can be realized by using local officials or volunteers to coordinate public participation efforts and prepare records of meetings;

o Consult with the public when identifying wastewater problems and screening alternative solutions, but before selection of principal alternatives for detailed evaluation;

o Provide the public with at least 30 days advance notice of meetings, such as town council or other regularly scheduled meetings;

o Hold a public meeting after alternatives are largely developed but before the preferred alternative is selected, and present preliminary cost information;

o Consider a midcourse review of your public participation program with your project reviewer;

o Hold at least one public meeting before adopting the facilities plan. You should indicate in a public notice that the recommendations of the facilities plan, including financial information, will be discussed. Specify where the facilities plan and other pertinent information is available for public review 30 days prior to the meeting;

o Allow the public to make written and oral statements; a question and answer session should be provided if possible. Prepare a complete record of the meeting and prepare a final responsiveness summary for inclusion in the facilities plan;

o Prepare and distribute a responsiveness summary after each public meeting. A responsiveness summary should summarize significant public comments, both adverse and beneficial, and the justification for rejection or incorporation of the comments into the plan; and

o Present at the meeting a brief summary of the facilities plan including the cost information developed in Chapter 7.

3.2 ENVIRONMENTAL DESCRIPTION AND ANALYSIS

The facilities plan will provide sufficient information to evaluate the environmental impacts of the principal alternatives on the natural and human environment. Evaluate the adverse and beneficial, direct and indirect, long-term and short-term monetary and nonmonetary impacts, and any irreversible or irretrievable commitments of resources. Any of the negative impacts could be the basis for eliminating an alternative from further consideration. Describe the reasons for rejecting an alternative in the facilities plan.

Because actions under the construction grants program are subject to the National Environmental Policy Act (NEPA) and EPA regulations (40 CFR Part 6), EPA cannot accept an application or award grant assistance for building of the proposed facilities until the environmental review of your project is complete. You may formally request an early determination of the scope of your environmental review. If, based on a determination by the State and EPA, a Categorical Exclusion cannot be issued, the environmental information you provide in the facilities plan will enable EPA to decide whether an Environmental Impact Statement (EIS) or A Finding of No Significant Impact (FNSI) is appropriate for the proposed project (Section 3.2.12) and will enable the reviewing agency to prepare an environmental assessment. If a Categorical Exclusion is appropriate, you will not be required to prepare a formal Environmental Information Document (EID) during facilities planning under 40 CFR Part 6 unless subsequent issues are raised. State requirements, however, may still apply.

To facilitate preparation of an environmental assessment, you should integrate the environmental analyses conducted throughout the facilities planning process into the facilities plan. A complete summary of the environmental analyses should be presented in a separate chapter. Revise the environmental analyses to include information developed during design and construction. The environmental information you provide in the facilities plan is termed an EID. Environmental information in the facilities plan describes:

- The proposed action, including purpose and need;

- The existing environment in the planning area as related to the evaluation of the alternatives and selection of a proposed project. The existing environmental conditions to be described in the facilities plan are listed in Section 5.1;

- The future environment without the project, i.e., the "no action" alternative and its effects on future environmental conditions in the planning area as discussed in Section 5.6;

- The development and evaluation of alternatives as described further in Chapters 6 and 7. Evaluate impacts on the environment as beneficial or adverse, direct or indirect, and long-term or short-term; and

- The environmental impacts of the selected alternative as described in Section 8.4 with special attention to unavoidable impacts, tradeoffs, commitments of resources, and measures to mitigate adverse effects;

- Sources of information used to describe existing and future conditions. Consult with regional, State and Federal agencies as appropriate early in the planning process for assistance in locating the sources of information.

Environmental resources in your planning area may be identified relatively inexpensively by:

- Conducting literature searches, interviews and limited field visits for familiarization with the area and identification of areas likely to contain sensitive resources (floodplains, wetlands, significant agricultural lands, endangered or threatened species habitat, cultural properties, parks, etc.);

- Using field surveys for positive identification and verification in areas directly impacted by the principal alternatives;

o Conducting intensive original field research only in areas directly impacted and when necessary to determine the significance of the resource, the nature and extent of the impacts and to develop mitigative measures.

EPA's decision either to issue a FNSI or prepare an EIS will be based on an environmental review of the information you provide in the facilities plan (Chapter 7). In addition, EPA must comply with procedures of other environmental laws and executive orders. Following are special topics which either require consultation with other agencies or describe procedures designed to avoid delays during the preparation and review of your facilities plan. Adverse impacts in any of these environmentally sensitive areas may result in the need for an EIS and the imposition of special conditions in your grant agreement.

An evaluation of your responses to issues raised during public participation and your integration of environmental evaluation into the facilities plan, by your project reviewer, is strongly recommended before initiating project design. For further assistance in evaluating environmental impacts, consult the EPA publication "Environmental Assessment of Construction Grants Projects" (FRD-5).

3.2.1 HISTORICAL AND ARCHAEOLOGICAL SITES

The National Historic Preservation Act and Executive Order 11593 establish procedures for consultation and commentary by the Advisory Council on Historic Preservation on EPA grant actions that will affect a property listed or eligible for listing on the National Register of Historic Places. Contact the State Historic Preservation Officer (SHPO) for information about properties listed or eligible for listing on the National Register. As early as possible in the planning, you should provide the SHPO with a base map showing the boundaries of the planning area. From this map the SHPO will be able to locate known properties which, where possible, should be avoided. Later, when alternatives are developed, provide the SHPO additional information or another map showing all potential alignments and sites where construction may occur. This will allow the SHPO to recommend whether a cultural resource survey is needed. Your project reviewer can advise you of specific procedures for consulting with the SHPO.

In general, your plan should avoid direct and indirect impact by the proposed facilities on identified properties or potentially sensitive areas. Any unavoidable direct impact will require an evaluation of the identified historic or cultural property, additional detailed information about the property, an evaluation of the potential effect the project may have on the property (36 CFR 800.3) and any proposed mitigative measures. At a minimum, adequate data on the property's boundary, integrity and its significance will be necessary to evaluate its eligibility for listing on the National Register (36 CFR 60.6).

Cultural resource surveys should be initiated early in the planning process and completed as soon as practical, but before award of grant assistance.

3.2.2 FLOODPLAINS, WETLANDS, AND FLOOD INSURANCE

EPA's Policy Statement of Procedures for Floodplain Management and Wetlands Protection requires EPA to prepare an assessment for any action under its programs that will affect a floodplain or wetland. In addition, States may also have special requirements for assessing impacts upon these sensitive areas. Information is generally readily available to identify 100-year floodplains and wetlands greater than 5 acres. Floodplains and flood hazard areas are shown on maps prepared by the Federal Emergency Management Agency (FEMA). Wetlands may be identified by maps available from the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (COE) or the Soil Conservation Service (SCS).

You should develop or modify alternatives to avoid direct or indirect impacts on wetlands and floodplains wherever possible. EPA will not fund costs for treatment works capacity for new developments on environmentally sensitive land, such as floodplains or wetlands.

If your project will affect wetlands, floodplains, impact navigable waters or cause the discharge of dredge or fill materials, consult with FEMA, USFWS, and EPA, and with the COE to determine whether a "404/Section 10" permit for discharge of dredge or fill material will be needed. If a permit is necessary, the COE should identify alternative locations to be evaluated and which environmental factors should be addressed.

If the selected alternative proposes construction or would serve new development in a flood hazard area, all affected communities will have to participate in the National Flood Insurance Program of the Federal Emergency Management Agency in order for you to receive Step 3 grant assistance. Early coordination among affected communities will help avoid delays in grant award.

3.2.3 AGRICULTURAL LANDS

In your facilities plan, evaluate the direct and indirect impacts of your project on significant agricultural lands. The policy aims to protect these lands from irreversible loss as an environmental or essential food production resource by locating facilities on agricultural land only when necessary to serve existing residential users (Section 6.5). Identify in your facilities plan significant agricultural lands in the planning area by consulting with the local office of the Soil Conservation Service, U.S. Department of Agriculture (USDA). Environmentally significant agricultural lands as defined by EPA and USDA include the following categories:

o Prime farmland - land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not developed land or under water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods;

o Unique farmland - land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.

Discuss additional farmlands of State, local and environmental importance with your project reviewer. Evaluate alternatives that will avoid or minimize adverse impacts on significant agricultural lands. Examples of mitigation measures are described in Section 3.2.11. Interceptors and collection systems should be located on significant agricultural land only if necessary to eliminate existing discharges or serve existing habitation.

3.2.4

COASTAL ZONE MANAGEMENT

The Coastal Zone Management Act requires that all Federal activities be consistent with approved State coastal zone management programs to the maximum extent practicable. If your project is located in the coastal zone of a State with an approved coastal management plan, a consistency certification will need to be submitted to the appropriate agency. Consult with the Office of Coastal Zone Management, U.S. Department of Commerce or the appropriate State agency for details. In developing and evaluating alternatives insure to the maximum extent practicable that they are consistent with any approved State coastal management programs applicable to the planning area.

3.2.5

WILD AND SCENIC RIVERS

To comply with the Wild and Scenic Rivers Act, EPA will determine from the Secretary of the Interior or Agriculture that the project will not directly and adversely impact any wild, scenic, or recreational river area. During facilities planning identify any inventoried or designated rivers in the planning area through consultation with the appropriate State agency and the National Park Service, Department of the Interior. Develop and evaluate project alternatives to avoid or mitigate adverse impacts on these rivers.

3.2.6

FISH AND WILDLIFE PROTECTION

The Fish and Wildlife Coordination Act requires that actions that will control or modify any natural streams or other body of water be undertaken so as to protect any fish and wildlife resources and their habitats that may be affected. During facilities planning consult the U.S. Fish and Wildlife Service and any appropriate State agency to find ways to prevent or lessen adverse impacts your project could have on fish, wildlife or their habitats.

Wastewater treatment facilities can attract birds that pose potential birdstrike hazards at nearby airports. If locating a wastewater treatment facility within 10,000 feet of an airport, you can coordinate the location with the regional Fish and Wildlife Service representative, and either regional Federal Aviation Administration officials for civilian airports or nearby military air base commanders.

3.2.7 ENDANGERED SPECIES PROTECTION

Under the Endangered Species Act if a project affects a species of plant, wildlife or its critical habitat that the Federal, State or local government lists as endangered or threatened, EPA will consult the U.S. Fish and Wildlife Service, National Marine Fisheries Service, or State agency to identify mitigative measures. Projects should avoid disrupting threatened or endangered species and their habitats, but if disruption is unavoidable, the facilities plan will suggest mitigative measures. Consult these agencies during facilities planning to determine whether the proposed planning area includes the habitats of listed species.

3.2.8 AIR QUALITY

The Clean Air Act requires all Federally funded projects to conform to approved State Air Quality Implementation Plans (SIP). During facilities planning evaluate the direct and indirect impacts of the alternatives on air quality. Consult with the State and regional agencies that monitor SIP compliance. Evaluate alternatives for compliance with the SIP and include measures to mitigate adverse impacts, if applicable.

3.2.9 WATER QUALITY AND QUANTITY

In your facilities plan, evaluate the capability of each alternative to meet applicable Federal, State and local water quality criteria. For existing facilities, discharges to surface water must meet the conditions in your National Pollutant Discharge Elimination System (NPDES) permits (5.3 and 4.1). Include a copy of the permit or a list of the NPDES effluent limitations in the facilities plan. The impacts of your discharge on estuaries should be carefully evaluated, for example, potential impacts on shellfish waters should be discussed with the appropriate State fish and health agencies.

Wherever effluent from proposed facilities will percolate or discharge into ground water, include in your facilities plan information and an analysis showing the impacts on the ground water. Demonstrate in your plan that the effluent, when mixed with ground water used as a public water supply, will comply with Federal, State and local environmental laws including the standards established under the Safe Drinking Water Act (40 CFR Part 141). Show that the facility to be built over the recharge zone of a designated sole or principal source aquifer and its effluent will not create an immediate or potential public health hazard.

In your facilities plan provide for the development of a program to periodically test water from existing potable wells in areas employing onsite treatment in the project area. If there are a substantial number of onsite systems in the project area, additional monitoring of aquifers may also be necessary.

A facilities plan should identify and evaluate special problems and the potential for erosion and sedimentation resulting from construction. Special problems include long grades, steep slopes and highly erodible soils. Special construction techniques that deal with these problems should be addressed. For project sites where dewatering operations are expected during construction, consideration should be given to minimizing adverse effects from the discharge of silt-laden waters by means of filtration, sedimentation basins or similar construction methods.

For projects that involve land treatment or disposal, methods of waste application should be carefully studied and selected to ensure soil erosion and sediment runoff is minimized.

You should include provisions in the facilities plan for supporting local and State shoreline stabilization efforts where appropriate.

The facilities plan should also address the indirect impacts on water quality caused by stormwater runoff resulting from substantial increased development. Other problems which may need to be addressed in your facilities plan include depletion of ground water, saltwater intrusion, or land subsidence.

3.2.10 DIRECT AND INDIRECT IMPACTS

Assess in your facilities plan both direct (primary) and indirect (secondary) environmental impacts of the principal and selected alternative. Direct impacts are caused by construction, operation or maintenance of the treatment works and may include for example:

- o Disruption of traffic, business or other daily activities during construction;
- o Damage to historical, archaeological, cultural or recreational areas during construction;
- o Disturbance of sensitive ecosystems such as wetlands and habitats of endangered or threatened species during construction;
- o Damage and pollution of surface waters due to erosion during construction;
- o Impacts on water quality from effluent discharge during operation;
- o Displacement of households, businesses, or services; and
- o Discharge of pollutants, noise or visual impacts.

Indirect impacts are caused by development made possible by the project and may include for example:

- o Changes in the rate, density, location or type of development, including residential, commercial or industrial; changes in the use of open space or other land;
- o Increased air, water, noise pollution, or solid waste from the induced changes in population and land use;
- o Damage to sensitive ecosystems (wetlands, habitats of endangered species) and environmentally protected areas (parks, historic sites) that result from changes in population and land uses; and
- o Socioeconomic pressures for expansion of existing facilities (housing, schools, highways) and services (police, fire, medical emergency) resulting from induced changes in land use and population.

The environmental analysis should give special attention to indirect impacts to determine whether they will violate Federal, State or local laws.

3.2.11

MITIGATING ADVERSE IMPACTS

Earlier sections have discussed real or potential adverse environmental impacts. Wherever possible, avoid or minimize adverse impacts. Where adverse environmental impacts are unavoidable, discuss methods, both structural and nonstructural, to mitigate them. Such actions may include:

Structural:

- o Changes in design, size or location of facilities;
- o Rerouting of interceptors to avoid sensitive areas;
- o Staging or orderly extension of sewer service;
- o Screening for noise or aesthetic purposes;
- o Systems for odor or aerosol control;
- o Cultural resource recovery including artifacts or important historical data.

Nonstructural:

- o Development and enforcement of sewer use regulations;
- o Protection of environmentally sensitive areas by local ordinance;
- o Modification of zoning ordinances, land use or development plans;
- o Stormwater runoff control ordinances; and
- o Water conservation programs to reduce wastewater flows.

Costs to mitigate the direct, adverse physical impacts of the building or operation of the treatment works are allowable for grant funding. Mitigative measures should be reasonable in cost and duration and should relate to the resource affected. Mitigation of indirect effects is best accomplished by nonstructural measures. Although you may select structural or nonstructural measures to mitigate indirect impacts, they are not grant eligible.

Grant assistance will not be awarded until your facilities plan provides for mitigation of adverse effects.

3.2.12

DETERMINING NEED FOR AN EIS

Whether a decision to prepare an EIS is made before, during or after completion of the facilities plan, it can be made only by EPA based on an environmental review (Section 9.2.2). EPA must prepare an EIS when any of the following conditions exist.

- o The treatment works will induce significant changes in industrial, commercial, agricultural or residential land use concentrations or distributions. Factors to be considered in determining if these changes are significant include: (1) vacant land subject to increased development pressure as a result of the treatment works; (2) population increases; (3) accelerated rate of change in population or population density; (4) potential for overloading sewage treatment works; (5) extent to which landowners may benefit from the areas subject to increased development; (6) nature of land use regulations in the affected area and their potential effects on development; and (7) deleterious changes in the availability or demand for energy.

o The treatment works, including the collection system will have significant adverse direct or indirect effects on wetlands or be located on wetlands.

o The treatment works, including the collection system, will have significant adverse direct or indirect effects on a habitat identified on the Department of Interior's or a State's threatened and endangered species list or their critical habitats.

o The treatment works, will cause direct or induced changes that: (1) displace population; (2) alter the character of an existing residential area; (3) adversely affect a floodplain or wetland; or (4) adversely affect significant amounts of prime or unique agricultural land or agricultural operations on this land as defined in EPA's policy to protect environmentally significant agricultural land.

o The treatment works will have significant adverse direct or indirect effects on parklands, public lands, or areas of recognized scenic, recreational, archaeological or historic value.

o The treatment works may have significant adverse direct or indirect effects through induced development on local ambient air quality or noise levels, surface or ground-water quantity or quality, or fish or wildlife and their natural habitats.

o The treated effluent will continue being discharged into a body of water for which the present classification is too low to protect present or recent uses and for which the effluent will not be of sufficient quality or quantity to meet the standards of these uses.

o The treated effluent will have an adverse impact on existing or potential sources of ground-water supply.

If an EIS appears to be necessary, based in part on review of your facilities plan, the applicable WQM plan, and clearinghouse comments, you should discuss the possible use of the joint EIS/EID approach (piggybacking) with your project reviewer.

A piggyback EIS/EID saves considerable time because the EIS is prepared concurrent with, rather than subsequent to, the facilities plan. To ensure independent review, the EIS and the facilities plan are prepared by different consultants.

If EPA determines that an EIS is needed, an expanded public participation program may be desirable.

Segments of a complete wastewater treatment system (Section 1.2) may receive subsequent grants if all of the following conditions are met:

o There are overriding cost or program considerations;

o The segment is noncontroversial;

o The segment is necessary to correct water quality or other immediate environmental problems;

- The segment by its completion will not foreclose any reasonable options; and

- A FNSI has been issued for at least 30 days prior to the grant award for that segment.

CHAPTER 4

WATER QUALITY MANAGEMENT PLANS RELATED TO FACILITIES PLANNING

4.0 WATER QUALITY MANAGEMENT PLANS

Several sections of the Clean Water Act have been consolidated into an integrated WQM planning process. Through this process State and areawide agencies conduct WQM planning activities designed to achieve the water quality goals of the Act. WQM activities are described in the State's WQM plan and the State's annual work program. A water quality based approach will allow States to focus on their priority water quality bodies, and when necessary, to provide adequate water quality protection beyond what will be achieved through technology-based control. In implementing a water quality approach for municipal treatment works and other pollution sources, 205(j) funds may be used to address the following basic questions:

- What is the use to be protected?

- To what extent does pollution contribute to the impairment of the use?

- What is the level of point source pollution control necessary to restore or enhance the use?

- What is the level of nonpoint source pollution control necessary to restore or enhance the use?

Key outputs of the WQM process for facilities planning include: (1) the State priority system, and (2) the problem assessment and trend analysis contained in the biennial 305(b) report. Once completed and approved, the State WQM plan becomes the foundation for other water pollution control activities. The State, or the agency to which the State has delegated WQM planning functions, will review each facilities plan in its area for consistency with the approved WQM plan. After a waste treatment management agency has been designated and a WQM plan has been approved, construction grants funds may be awarded only to those agencies for construction of treatment works that conform to the approved WQM plan.

Facilities planning is based on the wasteload allocations, delineation of planning areas, and population projections in the approved WQM plan. If this information is not available in an approved WQM plan, the reviewing agency may not approve grant assistance unless either the information was not within the scope of the WQM work program, or the grant is necessary to achieve the water quality goals of the Act. Facilities plans which are being prepared at the time of WQM plan approval should continue unless the WQM plan clearly justifies a change in the required treatment levels or alternative approach based on lower costs or significant environmental impacts.

4.1
STATE PRIORITY SYSTEM AND PRIORITY LIST

The State's priority system will result in the State's project priority list, from which projects are selected and certified by the State for EPA grant funding. States will identify priority water quality areas (PWQA) for use in setting priorities for projects. PWQAs will generally be water quality limited segments. The regulations require that the priority system include criteria for ranking projects based on the impairment of designated uses resulting from existing municipal discharges and the extent of surface or ground-water use restoration or public health improvement resulting from the reduction in municipal pollution. The State may also include other criteria in its priority system for ranking projects.

4.2
WASTELOAD ALLOCATIONS (WLAs)

The State agency establishes total maximum daily loads (TMDLs) for all municipal and industrial discharges to surface waters throughout the State. The TMDLs developed through WLAs are generally incorporated into the effluent limitations and compliance schedule in the NPDES permit and State discharge permit, if any. The WLA performed by your State is a critical factor in determining the level of your facilities planning effort. Projects which require greater than secondary treatment are subject to special reviews (Section 5.3).

4.3
305(b) REPORTS

Your State's biennial 305(b) report to Congress, describing the quality of its waters and the status of its water quality program, may contain useful information for the waters in your planning area. In preparing this report your State has been encouraged to describe the water quality benefits provided by the construction grants program, such as pollution reduction and preservation or enhancement of uses. Documentation of these benefits may be based in part on "before and after" water quality studies conducted using funds under 106, 205(g) and 205(J). The preoperation "before" study may be conducted as part of the WLA study, while the "after" study may be conducted after your facility is operating. Analysis of the water quality and biological data from these studies can be used to verify previous model predictions, detail the water quality improvements from your facility, and assist in planning and design of future facilities. Appendix C contains technical guidance on how to perform "before and after analyses."

CHAPTER 5

EXISTING AND FUTURE CONDITIONS

5.0
PROJECT NEED AND PLANNING AREA IDENTIFICATION

The wastewater treatment needs and facilities planning area for your community were identified during the WQM planning process based in part on effluent limitations in your NPDES permit, applicable ground-water criteria and State requirements. You should review this information to ensure that the planning area is large enough to take advantage of economies of scale and efficiencies possible in regional planning, or decentralized or individual systems. The planning area will also be sufficient to ensure that the most cost-effective means of achieving the established water quality goals can be implemented, and that an adequate evaluation of environmental effects can be made.

5.1
EXISTING ENVIRONMENT OF THE PLANNING AREA

The facilities plan describes existing environmental conditions to provide a basis for analysis of alternatives and a determination of direct and indirect impacts of the proposed project. The description should include:

o Surface and ground-water hydrology (quantity, quality and uses);

o Physiography, topography, geology and soils;

o Precipitation, temperature, and prevailing winds;

- o Terrestrial and aquatic plants, animals and natural communities;
- o Air quality and noise;
- o Energy production and consumption;
- o Population, socioeconomic, and public health conditions;
- o Land use and development;
- o Public facilities and services; and
- o Related Federal, State, and other projects in the planning area.

Clearly identify environmentally sensitive features and areas to be avoided or protected. You should consult with Federal, State, and regional agencies and the public early in the planning process. Reference sources of information used in the description.

5.2
EXISTING WASTEWATER FLOWS AND TREATMENT SYSTEMS

The facilities plan provides an inventory of existing wastewater characteristics and treatment facilities including areas served by onsite systems and their interrelationships. The inventory indicates conditions that limit the number of alternatives and the severity of the pollution problems and includes:

- o Major influent characteristics (particularly toxic pollutants) and their variability as a basis for design criteria and pretreatment needs;
- o The location of industrial and municipal treatment plants, sludge management areas and facilities, pretreatment plants, pumping stations, and sewer service areas;
- o A description of these facilities, including design capacities, existing flows, characteristics of wastes, NPDES permits, and overload conditions;
- o Locations of significantly developed areas served by onsite or unconventional systems;
- o A discussion and analysis of average, peak, dry and wet weather flows;
- o Locations of bypasses and overflows;
- o The extent of any combined (storm and sanitary) sewer system; and
- o A description of flow-reduction programs in effect.

5.3
EFFLUENT LIMITATIONS

Identify the applicable effluent limitations for all discharges and all NPDES permits (include identifying numbers) issued to existing facilities in the planning area. Effluent limitations are based on wasteload allocations developed by the State and will indicate the level of treatment required for each facility. At a minimum, secondary treatment or its equivalent is required for all municipal point source discharges to surface waters. Secondary treatment is defined generally as 30-day average not to exceed 30 mg/l each of bio-chemical oxygen demand and suspended solids. An amendment to the Clean Water Act allows the use of biological treatment processes such as oxidation ponds, lagoons, and ditches and trickling filters, provided the State certifies that water quality will not be adversely affected in effluent limited waters. The secondary treatment regulations will be revised also. Higher levels of treatment (referred to as advanced treatment or AT) may be required to meet State standards for water quality limited waters.

All projects with incremental costs for the advanced treatment over $3 million will be reviewed by the EPA Administrator. In such cases, the AT project can be approved only if the costs attributable to the more stringent levels of treatment are supported by a demonstration of significant improvement in water quality resulting in restoration of an impaired designated use or mitigation of existing public health problems. If AT is likely, it should be discussed at your preplanning conference or thereafter with your project reviewer. Note: Consideration of land treatment systems and reuse/recycling technologies is a normal part of facilities planning. These systems are especially applicable as alternatives to AT.

For existing treatment plants your NPDES permits will contain appropriate effluent limitations. If new discharge locations are proposed during facilities planning, the State will determine the effluent limitations for each new discharge.

5.4
INFILTRATION AND INFLOW (I/I) *

Before EPA can award grant assistance, the facilities plan will demonstrate that each sewer system discharging into the treatment works is not, and will not be, subject to excessive infiltration or inflow.

"Infiltration" is water, other than wastewater, that enters a sewerage system (including sewer service connections) from the ground, i.e., through defective pipes, joints or manholes. "Inflow" is water, other than wastewater, that enters the sewerage system from roof drains, cellar drains, cross connections with storm drains, catch basins, cooling towers, or drainage from springs or swamps. Excessive I/I is that portion of the infiltration or inflow which can be removed from the sewerage system through rehabilitation at less cost than continuing to transport and treat it.

You may determine the I/I conditions in the sewer system by analyzing the preceding year's flow records from existing treatment plants and pump stations. For smaller systems where flow records may not be available, you should obtain flow data by conducting flow monitoring at a single point at the treatment plant during high ground water and rainstorms.

You may use the following criteria to rapidly determine whether your system contains excessive I/I. When the flow rate measured during high ground-water conditions exceeds 120 gallons per capita per day (gpcd), or when the peak flow rate during a rainstorm exceeds 2.5 times the average treatment plant design flow, the system may have excessive I/I and further analysis may be necessary.

The nonexcessive infiltration rate of 120 gpcd contains two flow components: 70 gpcd of domestic wastewater base flow and 50 gpcd of infiltration. This is a national average based on the results of a needs survey of some 270 Standard Metropolitan Statistical Area (SMSA) cities.

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* The policy pertaining to I/I is being reviewed and will likely be revised in the final regulation because of numerous comments on the subject.

For systems where the flow exceeds the 120 gpcd or 2.5 criteria, you may select either to:

o Request the approval of the Regional Administrator to proceed with treatment works design without further analysis. In this case show that the proposed project or treatment system is cost effective and that the capital, operation, and maintenance costs for the additional capacity of the treatment works will be available. The federal funding of the treatment plant will be limited to that portion of the plant size of up to 120 gpcd.

o Or you may perform further study of the sewer system to determine the quantity of excessive I/I through a cost-effectiveness analysis. Under this option, you will propose a sewer rehabilitation program to eliminate the portion of I/I that is excessive and size your treatment plant accordingly. The Federal funding of the sewer rehabilitation program will be limited to the amount of I/I eliminated upon completion of sewer rehabilitation. In addition, you will certify the I/I conditions in the sewer system at the end of the first year of operations of a new treatment facility (Section 14.6).

If the analysis under the second option is conducted, results should be incorporated into the facilities plan to substantiate the I/I conclusions.

The results of your analysis should include:

o Total treatment plant flow, infiltration and inflow;

o Estimated I/I from service laterals;

o Estimated cost for transport and treatment of I/I;

o Estimated rehabilitation costs to eliminate cost-effective I/I;

o Excessive I/I;

o Nonexcessive I/I to be included in the design capacity of the treatment works;

o A proposed sewer system rehabilitation program; and

o A commitment to develop an effective sewer system operation and maintenance program (Section 5.4.1).

You may perform minor sewer rehabilitation prior to grant award (considered a preaward cost) when approved in advance by your reviewing agency provided the work is not a part of your municipality's normal O&M responsibilities. Where structural repairs are required for a large portion of the sewer system, make those repairs after grant award.

Although the regulatory requirements reflected in existing guidance on I/I analysis are no longer applicable, the technical information contained in MCD-19 may be useful in your analysis (see Appendix B of this book).

5.4.1
SEWER USE ORDINANCE AND SEWER MAINTENANCE PROGRAM

If a sewer rehabilitation program is prepared, it should address corrective actions to be included as part of a sewer use ordinance (Section 12.3). The portion of the ordinance addressing I/I should contain a realistic program for: removal of excessive infiltration from sewers located on private property (e.g., service laterals); removal of illegal connections from the sewer system (e.g., downspouts, storm or area drains); specify acceptable levels of infiltration for new sewers; and provide design details for new connections. The enactment and enforcement of the sewer use ordinance will help prevent overloading of the completed treatment works.

The sewer rehabilitation program should also contain a commitment to develop a comprehensive and effective sewer maintenance program. The maintenance program may be developed as part of your Step 3 grant activities (Section 8.5.3).

5.5 FUTURE CONDITIONS

The facilities planning period for wastewater projects should be 20 years beyond the date the facilities are scheduled to begin operation (up to 40 years for interceptor sewers). The 1981 amendments to the CWA, however, limit grant assistance for reserve capacity as follows:

(a) An interceptor that received a Step 3 grant on a segment before December 29, 1981 may receive grants for the remaining interceptor segments included in the facilities plan for reserve capacity as planned, up to 40 years;

(b) A primary, secondary or advanced treatment facility, or its interceptors included in the facilities plan may receive a Step 3 grant with 20 years reserve capacity if the grant is received after December 28, 1981, but before October 1, 1984;

(c) Except as provided in (a) above, a primary, secondary or advanced treatment facility, or its interceptors included in the facilities plan that received a Step 3 grant on a segment before October 1, 1984, may receive grants with 20 years reserve capacity for the remaining segments;

(d) Except as provided in (c) above, after September 30, 1984, no grant will be made to provide reserve capacity for a project for secondary treatment, or more stringent treatment, or new interceptors and appurtenances. Grants for such projects will be based on capacity necessary to serve existing needs (including existing needs of residential, commercial, industrial, and other users) as determined on the date of the approval of the Step 3 grant, but in no case greater than existing needs on October 1, 1990.

All incremental costs for additional capacity will be paid solely by your municipality.

The most cost-effective plan may provide for staging construction of operable parts of the facilities to meet changing conditions during the planning period. Your plan should consider not only constructing a facility now which satisfies your needs for the next 20 years recognizing the reserve capacity grant limitations, but also consider if it is more cost effective to construct a facility to satisfy your needs in 10 or 15 years and later construct additional facilities if and when they are required. The objective of evaluating staging of construction is to ensure that oversized facilities are not constructed thereby precluding a potential financial burden or possible adverse environmental effects resulting from the project, particularly if the expected growth fails to occur (Section 6.9).

5.5.1 POPULATION AND LAND USE PROJECTIONS

Wastewater treatment needs and design capacities for your facilities planning area will be determined by land use patterns, economic growth, and the resulting population growth. The estimates of population in your planning area during the next 20 years are to be constant with current state projections and those used in the most recently completed Needs Survey. This projection is based on 1977 or later population projections prepared by the Bureau of Economic Analysis of the Department of Commerce or your State's projections as approved by EPA. The State may decrease existing projections if used consistently statewide. In any case, the projected State population figures are to be consistent for air and water planning.

Most States have completed population projections. If projections are not available you may: prepare your projection by calculating your average yearly growth rate from 1970 to present and assuming that growth rate will continue, multiply that rate by 20 years (planning period); or compute the growth rate of a larger area (township, county for example) where future population projections are available and assume your community will grow at the same rate. If in doubt as to what population projection to use for your community, consult your project reviewer.

The facilities plan should be carefully coordinated with land use plans. Projected land use patterns and densities are one basis for determining the optimum capacity and location of facilities. Where land use plans have not been prepared for all or part of the planning area, you can estimate future land use patterns and densities in consultation with existing planning agencies and zoning commissions.

Lands where development should be avoided, such as highway rights-of-way, powerline easements and environmentally sensitive areas (e.g., significant agricultural lands, parks and historic or archaeological sites), are not to be included when estimating future development patterns and densities.

5.5.2
FORECASTS OF FLOWS AND WASTELOADS

The facilities plan relates the size and capacity for the facilities to the needs in the planning area. In determining design flow for the treatment works, consider: existing base flows; estimated future flows from residential, commercial, institutional and industrial sources; and nonexcessive I/I. Existing base flows equal actual metered flows minus the excessive I/I.

You should estimate future residential, commercial, and institutional flows based on one of the methods described below. Each method combines the sources of wastewater flows and expresses their total contribution in terms of "residential population equivalent" or gpcd. Capacity to accommodate future increases of per capita flow over time should not be proposed or approved for grant funding.

o Method 1 - Base your estimate of existing average daily flow on reliable water supply records adjusted for consumption and other losses, or on records of wastewater flows for extended dry periods minus estimated dry weather infiltration. This figure should be further reduced by industrial users and limited users (e.g., seasonal population). The resulting figure (gpcd based on existing sewered residential population equivalent) is then multiplied by the future projected population. This method is preferred and should be used whenever possible.

- o Method 2 - When water supply or wastewater flow records are inadequate, you should calculate future average daily base flows (ADBF) by multiplying one of the following gpcd figures by the future population projection. For nonstandard metropolitan statistical areas where the total population 10 years in the future is projected to be 5,000 or less a figure of 60 to 70 gpcd should be used. In all other instances 65-80 gpcd is acceptable. The reviewing agency may approve a larger value if existing commercial and institutional sources contribute a substantial share of the total ADBF.

The treatment works may include capacity for both existing and future industrial flows (Section 6.8). You should contact existing industries during the planning process to determine whether existing flows will increase or decrease and the characteristics of their discharges. This evaluation could include: industrial recycling, estimated user charges, potential increased efficiency, and the general economic situation. You should consider requiring letters of intent from all industries intending to increase their flows, locate in the area, or contribute significant industrial discharges.

Flow allowances for unknown future industrial growth should not exceed 5 percent (or 10 percent for a town with less than 10,000 population) of the total design flow of the treatment works before the unknown future industrial flow was considered or 25 percent of the total industrial flow (existing plus documented future). In all cases, unknown future industrial growth provisions should conform with WQM plans, land use plans and zoning ordinances.

5.5.3
FLOW REDUCTION The facilities plan will include an evaluation of alternative flow and reduction measures unless: the existing ADBF is less than 70 gpcd or the reviewing agency determines the area has an effective existing flow reduction program.

When these conditions are not met, the facilities plan should consider:

- o A public information program to encourage wastewater reduction;
- o Changes in water pricing policies to promote conservation;
- o Installation of water meters and retrofitting existing homes with water saving devices;
- o Changes in local ordinances or codes that require installation of water saving devices in new homes or other buildings.

Your plan should include recommendations on which flow reduction techniques can be cost-effectively implemented when the project becomes operational. It should also include projections of expected flow reductions in 10 and 20 years. The analysis should consider potential increased costs of: administration, a public information program, public and private sector costs for retrofitting existing buildings, and the additional costs for installing water saving devices in lieu of conventional devices. The analysis should also consider reduced or deferred construction and operating cost (including energy) for your water supply system, water and wastewater treatment works.

The plan should discuss steps to implement flow reduction. A public information program should highlight recommended flow reduction measures, their costs, potential savings and costs for a typical household. A recent EPA publication, "Flow Reduction Handbook," FDR-15, contains analysis procedures and examples which may assist you (see Appendix B).

5.6
FUTURE ENVIRONMENT WITHOUT THE PROJECT

The description of the future conditions developed in the preceding sections will help document the need for the project and will provide a benchmark for comparison with other alternatives (Chapter 6). This description of the future environment without any project is termed the "no action" alternative and is to be evaluated as an alternative to your project. The "no action" alternative will frequently be appropriate for a portion of the planning area.

CHAPTER 6

DEVELOPMENT AND SCREENING OF ALTERNATIVES

The primary objective of facilities planning is to develop and evaluate alternatives (not to be confused with "alternative technology," Section 6.4.1) and select the most cost-effective project for wastewater management in the planning area. Note, however, that cost effectiveness includes consideration of a variety of factors (economic, environmental, social, institutional). The evaluation and selection process seeks to identify the alternative which is the most economical means of meeting applicable effluent and water quality and public health requirements over the useful life of the facility while recognizing environmental and other nonmonetary considerations, and is implementable from legal, institutional, financial, and management standpoints.

Small communities should consider the possible use of simplified (generic) plans to help select the most cost-effective alternative. This should be discussed with your project reviewer. For larger communities, all feasible alternative waste management systems are identified and screened to determine those principal alternatives that are capable of meeting Federal, State, and local criteria. Evaluation of principal alternatives is discussed in Chapter 7.

6.0
OPTIMUM OPERATION OF EXISTING FACILITIES

Include in your facilities plan an evaluation of improved effluent quality attainable either by upgrading the operation and maintenance of existing facilities as an alternative or supplement to construction of new facilities. Include an explanation of why improved effluent quality cannot be obtained cost effectively if your facilities plan recommends complete or partial abandonment of existing facilities.

An evaluation of existing facilities, including onsite disposal systems such as septic systems, may reveal that they can function more efficiently with the addition of new equipment, operational changes, or the addition and training of operating personnel.

Problems with plant and onsite system operation are usually due to one or more of the following:

o Adequacy of the treatment plant design for the character and amount of waste treated (including I/I and industrial flows;

o Adequacy of O&M program including process control method, laboratory procedures, maintenance management systems, staffing, salaries, and replacement funds and schedules;

o Site-related problems.

o Outdated or failing equipment.

You should describe the cause, extent, nature and location of malfunctions.

EPA publication MO-16 "Performance Evaluation and Troubleshooting at Municipal Wastewater Treatment Facilities" and report form 7500-5, and the Design Manual: "Onsite Wastewater Treatment and Disposal Systems" provide detailed system evaluation guidance.

Whatever the results of the evaluation, identifying the possible optimum operation of existing facilities will help determine if additions, expansions or replacements must be made, and the extent to which existing facilities can be converted or used in lieu of a new system. Consider any improvements expected as a result of future pretreatment by industrial contributors, removal of excessive I/I, or staging of new capacity.

6.1
REGIONALIZATION

If the facilities planning area includes several communities, each served by separate facilities or systems for wastewater disposal, a planning approach that considers regional management as well as physical consolidation of systems should be considered. These approaches may have been evaluated or recommended in an approved water quality management (WQM) plan for the area and should be followed as appropriate.

Alternatives for a large planning area may involve various arrangements for construction, operation, maintenance and management. For example, several jurisdictions may form a regional authority to construct, operate and maintain a centralized treatment system for the entire planning area. As another approach, one jurisdiction may serve as a lead agency for construction, operation and maintenance of separate facilities that serve each of the jurisdictions.

Regionalization need not involve construction of physically interconnected facilities. Rather, individual jurisdictions may be responsible for construction of municipal facilities and onsite systems while a regional authority may be formed to administer one or more operation and management functions, such as sludge management.

Regional facilities have various advantages and disadvantages. Advantages may include: savings in personnel, materials and supplies, more treatment capability per dollar, higher operator skill levels, better performance of treatment plant, opportunities for offsetting treatment, and fewer sites and effluent discharge points. Fewer sites and discharge points could reduce direct environmental impacts.

Disadvantages may include: higher costs due to heavy reliance on technology, longer design and construction time, potential for induced growth and resultant adverse environmental impacts, depletion of streamflow, concentrated discharge, and need for intermunicipal service agreements.

When considering regional alternatives involving construction of new interceptors or collector sewers to connect communities in the planning area, evaluate the environmental factors discussed in Section 3.2. Additional guidance for evaluating interceptor and collection systems is provided in Section 6.5. The cost for the collection system portion of a project in a small community generally represents at least 50 percent of the total household cost and can represent six times the cost of the treatment plant alone. For this reason, the financial impact of extending sewers should be carefully evaluated (Section 7.2).

The reviewing agency will exercise discretion with regard to the stage of development of intermunicipal service agreements for Step 2+3 projects or projects which receive advance funding. Executed agreements or equivalent documented commitments are to be submitted with a Step 3 application or before initiation of procurement action for building the project for Step 2+3 grant assistance (see Introduction - Managing Your Project).

Regionalization with an unincorporated area is usually accomplished in the following ways:

o An intermunicipal agreement where a "municipality" (i.e., county) signs on behalf of the unincorporated area;

o Voluntary annexation (you may not require annexation as a prerequisite to sewer service);

o Service contracts with individual users.

6.2
UNSEWERED AREAS Identify in the facilities plan existing systems used for wastewater disposal that are causing or are likely to cause public health problems, are contaminating ground water, or are violating NPDES permits. If the proposed project will include a new conventional or small alternative wastewater system (Section 6.4.3) for a portion of the planning area, you should provide the following information to justify the need for the project:

o Specific documentation of the nature and extent of health, ground water or discharge problems associated with existing wastewater disposal systems;

o Pertinent information (soil classification maps, previous soil borings or excavation data, percolation test results, historical data) documenting physical restrictions to the use of onsite systems; and

o Documentation of the nature, number, frequency and location of malfunctioning onsite systems. A community survey which describes and analyzes the system failures is recommended. Use of maps, aerial photography or leachate-sensing equipment for representative samples will generally avoid the need for gathering detailed engineering data house to house except where geologic conditions are unusual or inconsistent.

Where the need to replace onsite systems has been determined, the facilities plan should compare conventional collection and treatment systems to small alternative wastewater systems. Discussions for evaluation of alternatives for unsewered communities are further described in Section 6.2.

6.3 CONVENTIONAL COLLECTION SYSTEM

A conventional collection system is a collection system carrying essentially raw wastewater, consisting of 6-inch diameter or larger gravity collector sewers normally with manholes, force mains, pumping and lift stations and interceptors leading to a central treatment plant. Because the Clean Water Act is intended primarily to correct existing water quality problems, new conventional sewage collection systems are grant eligible only where the bulk (generally two-thirds of the expected flow (existing plus future residential users)) will be from the resident population on October 18, 1972 (the date the Federal Water Pollution Control Act amendments were enacted) and where new development will not occur on environmentally sensitive areas. Where new collectors are funded provide assurances that the existing populations will connect within a reasonable time after project completion.

The 1981 amendments modified the earlier legislation and discontinues grants for conventional collection systems after October 1, 1984, except when a Governor exercises his discretionary authority to approve such projects for grant assistance.

Where the population density within a proposed collection system area is greater than 6 persons per acre (two households per acre), conventional gravity collector sewer construction and centralized treatment may be cost effective.

Where the population density is less than 6 persons but 1.5 or more persons per acre (one household per 2 acres), both conventional and small alternative wastewater systems should be evaluated.

Where the population density in an area is less than 1.5 persons per acre (one household per 2 acres), conventional collector sewers will generally be considered noncost effective unless a severe pollution or public health problem exists and conventional collector sewers are shown to be clearly more cost effective than any alternatives for sparsely populated areas (Sections 6.4.3 and 6.4.4).

6.4 WASTE TREATMENT MANAGEMENT TECHNIQUES

Earlier sections have discussed upgrading existing facilities, the "no action" alternative, and regional management alternatives that are to be evaluated in your facilities plan. To insure that your analysis identifies the BTWTT also evaluate at least the following:

- o Biological or physical-chemical treatment and discharge to surface waters (conventional concepts of treatment);
- o Innovative and alternative technologies (Section 6.4.1);
- o Land application or other systems for the reuse of wastewater and recycling of pollutants (Section 6.4.2);
- o Small alternative wastewater systems (including onsite systems and alternative conveyance systems, Sections 6.4.3 and 6.4.4); and
- o For sewered communities with a population of 10,000 or less, consider at least one of the following: facultative ponds, trickling filters, or overland flow land treatment;
- o For unsewered communities of 10,000 or less, consider onsite systems.

Your facilities plan should evaluate each of these management techniques and include provisions for applying the best BPWTT. BPWTT is defined as the cost-effective technology that can treat wastewater, combined sewer overflows, nonexcessive I/I, and residuals in publicly owned or individual wastewater treatment works and meet the applicable provisions of:

- o Part 133 for secondary treatment and discharge to surface waters;
- o Part 125, Subpart G for marine discharge waivers (less than secondary);
- o Part 122.62(d) for higher levels of treatment beyond secondary if required to meet more stringent water quality or State standards; and
- o "Alternative Waste Management Techniques for Best Practicable Waste Treatment" (41 FR 6190) for percolation to ground water after land application, land treatment or reuse.

As each management technique is evaluated, consider opportunities to generate revenues and reduce the use of, or recover energy (e.g., sale of methane gas after anaerobic digestion or sale of processed sludge) thereby offsetting some of the O&M costs.

6.4.1 INNOVATIVE AND ALTERNATIVE TECHNOLOGY (I&A)

I&A technology is a concept introduced by the CWA which provides for reclaiming and reuse of water, productive recycling of wastewater constituents or otherwise eliminating the discharge of pollutants, reducing consumption of or recovering energy, or reducing costs. Innovative technology differs from alternative technology and conventional concepts of treatment because it involves a higher degree of risk to gain specific benefits. Both alternative technology and conventional concepts of treatment are candidates for innovative classification if they meet a specific criterion.

Alternative technology employs proven techniques which reclaim wastewater, recycle nutrients, save energy or conserve resources. Examples of alternative technologies include:

- o Processes and techniques for the treatment and use of effluents such as land treatment, aquifer recharge, aquaculture, silviculture; and direct reuse for industrial and other nonpotable purposes, horticulture and revegetation of disturbed land; total containment ponds and ponds for the treatment and storage of wastewater prior to land application;
- o Land application of sludge for horticultural, silvicultural or agricultural purposes (including supplemental processing by means of composting or drying), and revegetation of disturbed lands;
- o Energy recovery facilities such as codisposal measures for sludge and refuse which produce energy, anaerobic digestion facilities with 90 percent or greater methane recovery and use, and self-sustaining incineration;
- o Individual and other onsite treatment systems with subsurface or other means of effluent disposal and facilities constructed for the specific purpose of septage treatment.

* Innovative projects, on the other hand, employ techniques that are not fully proven under the circumstances of their contemplated use and that provide advancement over the state-of-the-art. This definition recognizes a reasonable level of risk and corresponding benefits for innovative projects. Conventional concepts of treatment or alternative technologies may be classified as innovative if through an unproven improvement or modification of the process the project results in a significant cost reduction when compared to an appropriate conventional technology. Significant cost reduction may be considered in the range of 15 percent reduction in life cycle costs, i.e., present worth of the costs over the planning period of the project. Energy reduction may be translated to dollars using the appropriate regional cost conversion factors.

In order to encourage evaluation and use of I&A technology projects, the regulations provide incentives including:

- o Federal grant assistance of up to 85 percent (up to 75 percent after October 1, 1984);
- o Special set-asides of grant funds for use only on innovative or alternative (I or A) projects;
- o Higher priority on State's project priority list;
- o Eligibility for grant assistance of field testing (Section 10.1);
- o 100 percent replacement or modifications for projects which fail under certain circumstances (Section 15.2);
- o 15 percent cost preference for alternative technology over conventional projects.

In order to assist you and your Architect/Engineer A/E in evaluating

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*The definition of innovative technology is being reviewed and will likely be revised in the final regulation because of numerous comments on the subject...

I&A projects, EPA has established an I&A program which provides technical and administrative assistance. In addition, EPA has established a small alternative wastewater technology (SAWS) clearinghouse at West Virginia University (address in Appendix B).

6.4.2 LAND APPLICATION

Land application for treatment and disposal of effluents is encouraged by both the CWA and the EPA because of its many advantages. These advantages include potential cost and energy savings, recycling or reclaiming of resources, and higher levels of treatment when compared with conventional concepts of treatment. To encourage the use of land application techniques, grants may be increased up to 85 percent funding and costs of land used as an integral part of the treatment process are allowable for grant funding (Section 8.4.6). The 15 percent cost preference is also applicable for publicly owned land treatment systems.

During facilities planning, a two-phase approach to the evaluation of land treatment alternatives is recommended. The first phase should include enough detail to determine if sites are available, soils are suitable, and whether the cost of land treatment is competitive with other alternatives. If these conditions are met, phase 2 would include an in-depth investigation of sites and refinement of design factors. An analysis of land treatment should include:

o Site selection--A map of the planning area showing the tracts of land evaluated as potential land treatment sites. The plan should describe reasons for rejecting sites as well as the availability of suitable sites. Categorical elimination of land treatment for lack of suitable sites is generally unacceptable unless well documented and supported by adequate data;

o Loading rates and land area--Values used for these design parameters should agree with established ranges in EPA design manuals (Section 11.0.14). Values outside the established ranges should be justified and supported by a discussion of extenuating circumstances;

o Estimated costs--Costs for land treatment should be compared with those in the EPA design manuals as updated using current and local cost indexes. Elimination of land treatment due to land and transport costs should be documented;

o Preapplication treatment--The level of pretreatment prior to land application should conform with EPA design manuals for the type of process used. Treatment more stringent than recommended in the design manual should be justified. If documentation is not acceptable, the costs of the additional processes beyond those recommended in the design manual may be unallowable for grant funding;

o Environmental effects--The environmental evaluation of land treatment systems should emphasize quality and quantity of surface and ground-water resources, energy conservation, pollutant recycling, and compatibility of land use. BPWTT criteria are to be met for protection of ground water based on current quality and uses of the water (Section 3.2.9).

Three techniques of land treatment have been identified as potentially cost effective. These include slow rate irrigation, rapid infiltration and overland flow and are discussed separately in EPA design manuals. Other possible application techniques include ground-water recharge to prevent saltwater intrusion along coastlines, recreation purposes or municipal water supplies. Each technique, however, should be carefully evaluated to ensure protection of the public health and to avoid significant adverse environmental impacts.

Where land application techniques require the use of large tracts of land, EPA encourages leasing or contractual arrangements rather than land purchase. This is especially true for small alternative wastewater systems (1 mgd or less) and where marketable irrigation water could result in a nominal or no fee lease.

6.4.3
SMALL ALTERNATIVE WASTEWATER SYSTEMS (SAWS)

SAWS are characterized by onsite treatment systems (e.g., septic tanks and drain fields) and nonconventional collection systems (e.g., small diameter sewers) serving one or a cluster of users. Small communities with a population of 3,500 or less or sparsely populated areas of larger communities may receive up to 85 percent grants for SAWS because they qualify as alternative technology (Section 6.4.1).

Twenty-one SAWS are briefly described in an EPA publication (FRD-10) available from your project reviewer. Detailed technical descriptions of many of these systems are found in EPA's "Design Manual for Onsite Systems Wastewater Treatment and Disposal" (EPA-625/1-80-012). These systems include:

o Land treatment;

o Subsurface disposal or mound systems;

o Cluster systems that serve several users;

o Small diameter gravity sewers (6 inches or less);

o Pressure or vacuum sewers;

o Dual systems (blackwater/graywater).

You are encouraged to review EPA publications, several of which describe SAWS in lay terms while others provide technical design data for use by your A/E firm (see Appendix A for titles).

Renovation of existing or construction of new SAWS should be given thoughtful consideration in your facilities plan, especially if your municipality is not presently served by a conventional collection and centralized treatment system. Combinations of SAWS and conventional systems may also offer considerable savings compared with a single conventional collection and centralized treatment system. For example, septic systems work quite well in many small towns except in one isolated area such as a business district or "downtown" area where open space for septic systems is not available. In this case, the business district may be served by a conventional collection and treatment system while the outlying areas may use septic systems.

SAWS may only be allowable for grant assistance if they serve principal residences and small commercial establishments that were inhabited or in use on or before December 27, 1977, the date the Clean Water Act Amendments were signed. This should not, however, preclude connection of residences and small commercial establishments along the line that were inhabited or in use after this date where their flows are incidental.

Municipal access to SAWS is required. While this requirement may be met by an easement or a covenant, it may be easily satisfied by a simple agreement that is recorded with the deed. Another option is State enabling legislation which ensures access to municipal wastewater land disposal zones.

For publicly owned systems, the agreement referred to above should state that:

o The municipality will retain ownership of the system which will be "publicly owned;"

o The municipality will be able to enter the property for construction or O&M purposes at reasonable times for the life of the project; and

o The municipality will have complete control over the system.

For privately owned systems (Section 6.4.4) a simple agreement will suffice if it is recorded with the deed for each individual system and provides access to the system at all reasonable times for inspection, monitoring, construction, maintenance, operation, rehabilitation and replacement.

Title abstracts or insurance, detailed property and septic tank location descriptions, or land surveys are not required for either publicly or privately owned systems.

Describe in the facilities plan a management program for SAWS to be implemented after award of grant assistance. The program should include:

o Physical inspection of all onsite systems in the planning area at least every 3 years;

o Pumpouts, renovation and replacement as needed;

o Routine maintenance and servicing of mechanical and electrical components;

o Testing of selected existing, local potable water wells once a year;

o Additional monitoring of water supply aquifers, if appropriate, where substantial numbers of onsite systems exist; and

o User charge system and financing plan.

Your program could also provide for review and approval of new sites and installations, and a public education program for homeowners on the operation and maintenance of their individual systems.

For a more complete discussion of management programs, see "Facilities Planning for Management of Small Alternative Wastewater Treatment Systems" (see Appendix B).

You may use the 15 percent cost preference (see Section 7.0.3) to determine if the SAWS is the most cost-effective alternative, unless they are privately owned individual systems. Also, see Section 7.2.1 on financial impact analysis for small communities.

6.4.4 INDIVIDUAL SYSTEMS

Individual systems are small alternative wastewater treatment systems that are privately owned. Normally, these are onsite systems with localized treatment and disposal.

As a financial incentive to small or rural communities, an eligible municipality may apply for a grant for construction of individual, privately owned treatment works when they are shown to be cost effective and public ownership is not feasible.

Private systems may serve "principal residences" (residence for 51 percent or more of the year, i.e., not second homes or recreation residences), and compatible wastes from "small commercial establishments" with dry weather wastewater flows of less than 25,000 gallons per day. Private nonprofit entities such as churches, schools, hospitals or charitable organizations are considered small commercial establishments.

Privately owned systems do not qualify for use of the 15 percent cost preference to determine the most cost effective alternative. However, they are eligible for up to 85 percent grant assistance since they are alternative technology. Also see Section 7.2.1 on financial impact analysis for small communities.

6.5 EVALUATION OF SEWER ALIGNMENTS

Since the location, length and size of interceptors and collectors will influence growth in the planning area, they should be planned carefully and considered for staging of construction. You should:

- o Not extend interceptors into environmentally sensitive areas unless necessary and then only if they eliminate existing discharges or serve existing communities that violate an enforceable requirement of the CWA;
- o Evaluate direct and indirect impacts of interceptors on environmentally sensitive areas such as floodplains, wetlands, and significant agricultural lands, and undeveloped lands (less than one household per 2 acres);
- o Identify measures to minimize adverse impacts on environmentally sensitive areas where no practical alternative exists.

EPA will not fund portions of treatment works providing capacity for new development in environmentally sensitive areas and may impose conditions on subsequent grants, including restrictions on sewer hookups, or condition NPDES permits to ensure implementation of mitigating measures. Limits on the eligibility of collectors are discussed in Section 13.2.

Assess the need for interceptors, areas to be served and the existence of environmentally sensitive areas in your facilities plan. Consider alternative routes for interceptors in light of the above factors.

6.6 USE AND DISPOSAL OF SLUDGE

A significant byproduct of wastewater treatment is the production of sludge. Use or dispose of your sludge with as much care as you give to the disposal of treated wastewater effluents. Take three important factors into account:

o Safe use and disposal that will not result in adverse impacts on human health and the environment;

o Economical and cost-effective sludge disposal (including operation and maintenance costs); and

o Public acceptance of sludge disposal risks, costs, alternatives, and environmental consequences; pay particular attention to siting problems.

Many different treatment and disposal methods are available for evaluation. In general, these methods can be considered in two major categories:

o Treatment and volume reduction--incineration (thermal reduction), composting and surface impoundments; and

o Ultimate utilization and disposal--landfills, ocean dumping and discharge, landspreading and distribution/marketing.

Some methods of sludge utilization are considered alternative technology (landspreading, for example) and are eligible for up to 85 percent grant funding. Other methods are candidates for innovative classification if they meet the criterion. Land used as part of the sludge treatment or disposal method is eligible for grant funding provided the sludge is used productively.

Because of the nutrient value of sludge, EPA encourages close examination of landspreading techniques. While certain restrictions are necessary (heavy metals loadings, for example), landspreading of municipal sludge can be effectively employed as a means of recycling a valuable resource.

Note that municipal sludge is addressed in the regulations implementing the "Resource Conservation and Recovery Act" (RCRA) which provides regulation of solid wastes including toxic and hazardous materials. Regulations implementing the RCRA provide that:

o Sewage sludge in all cases is considered a solid waste;

o Sewage sludges can be subject to control as hazardous wastes;

o Municipalities are to determine if their sludge is hazardous; and

o If a municipal sludge is hazardous, the municipality will obtain a hazardous waste identification number and may need a permit to treat, store or dispose of sludge for volumes greater than 1,000 kg per month.

In general, municipal sludge is not hazardous unless stormwater or industrial dischargers are major contributors to the wastewater treatment system.

Because of the complex nature of sludge disposal EPA has prepared "A Guide to Regulations and Guidance for the Utilization and Disposal of Municipal Sludge" (MCD-72). You should obtain a copy of this publication and also discuss sludge disposal options with your project reviewer.

6.7 COMBINED SEWER OVERFLOWS (CSO's)

The costs and benefits from control of combined sewer overflows (CSO's) vary with numerous environmental and system-related factors. Decisions relating to CSO's are made on a case-by-case basis.

Control of pollution from CSO's should be considered if application of BPWTT for dry weather flows would not meet water quality standards. Treatment or control of CSO's should be considered only after secondary treatment of all dry weather flows in the area is assured. (Exception: where EPA has received an application for a marine discharge waiver under Section 301(h) of the Clean Water Act).

Where measures may be proposed for the control of CSO's, the facilities plan should evaluate the following for the 20-year planning period:

o Alternative control techniques and management practices that could attain various levels of pollution control;

o Cost of achieving various levels of pollution control by each of the control techniques that appear to be most feasible and cost effective;

o Benefits to receiving waters of a range of pollution control alternatives during wet weather conditions. Consult WQM plan as appropriate;

o Costs and benefits from addition of advanced treatment (AT) processes for dry weather flows in the area as an alternative to CSO control.

The alternatives selected for control of CSO's should meet the following criteria:

o The analysis demonstrates that the proposed level of pollution control is necessary to protect an attainable beneficial use of the receiving waters even after the standards required by the Clean Water Act for industrial discharges are met and a minimum of secondary treatment is achieved for all dry weather municipal discharges in the area;

o Provision has been made for funding of secondary treatment of all dry weather flows in the area or an application for a marine discharge waiver has been received by EPA;

o The technique proposed for CSO control is more cost effective for protecting beneficial uses than other CSO control techniques plus higher levels of treatment for dry weather municipal flows in the area (CSO Guidebook and CSO Manual-Appendix B);

o The marginal costs of control are not substantial compared to marginal benefits.

If portions of the planning area are served by combined sewers and an evaluation of CSO abatement is to be included in the facilities plan, you should request additional guidance from your project reviewer. To determine what portion of CSO control costs for a multiple purpose project are allowable for grant funding, refer to the multipurpose discussion in Section 7.0.4.

Beginning October 1, 1984, grant assistance, at a Federal share of 55 percent, for correction of CSO problems will be considered only upon the request of a Governor where CSO correction is on the State priority list and upon demonstration that significant usage of the water for fishing and swimming will not be possible without the proposed project, and that the project will result in restoration of an existing impaired use. Beginning October 1, 1982, additional funding, if appropriated, will become available to address water quality problems of marine bays and estuaries due to CSO's.

The Clean Water Act prohibits grant assistance for control of pollutant discharges from a separate storm sewer system.

6.8 MUNICIPAL TREATMENT OF INDUSTRIAL FLOWS

Consider the issues mentioned below when planning municipal treatment facilities that will accommodate industrial flows. The treatment works design capacity may include allowances for industrial flows if the principal purpose of your project and system is the transport or treatment of domestic discharges of the entire community, area, region or district concerned (Section 5.5.2). However, grant assistance will not be provided.

o To convert noncompatible industrial wastewater to compatible, or to transport or treat noncompatible industrial wastewater;

o For costs to transport or treat wastewater from a Federal facility contributing more than 250,000 gpd, or 5 percent of the design flow of the complete wastewater treatment system, whichever is less.

Where industries will be served by the planned facilities, a pretreatment program is required when:

o The municipal treatment works has a flow greater than 5 mgd and serves or is expected to serve industries subject to pretreatment standards under the CWA;

o The WQM plan has not provided for development of an approvable pretreatment program.

Other situations when a pretreatment program may be required should be discussed with your project reviewer. Section 8.5.4 identifies specific elements to be included in a pretreatment program.

6.9 STAGED CONSTRUCTION

Adding plant capacity or extending interceptors in stages during the 20-year planning period may be more cost effective than full development immediately.

Factors you should consider are:

o Relative cost of providing full capacity initially compared with the present worth of deferred costs for providing capacity when needed; and

o Uncertainties of projecting long-term wastewater flows and possible technological advances or flow and waste reduction measures which may limit need for full capacity.

Modular development of operable components of a treatment plant is advisable in areas where high growth rates are projected, where treatment must become more stringent later in the planning period, or where existing facilities are to be used initially but phased out later.

To evaluate the cost effectiveness of staged construction in your facilities plan, you should select an appropriate staging period as shown in the chart below unless your State has developed other guidelines.

If the ratio of:

Q_D/Q_1 is	Max. Staging Period (Years)
Less than 1.3	20
1.3 to 1.8	15
Greater than 1.8	10

Where Q_D is flow at end of 20-year planning period and Q_1 is flow at beginning of plant operation.

The staging period for interceptors is normally 20 years. However, within the limitations on reserve capacity discussed in Sectin 5.5, a larger interceptor may be appropriate. You should consider:

- The larger pipe would reduce the adverse direct and indirect environmental impacts;
- It is consistent with projected land use patterns; and
- It is not in conflict with Federal, State or local environmental laws.

When determining the size of the interceptor you should also consider the following:

- Daily or seasonal variations of flow, timing of flows from various parts of the tributary area, and pipe storage effects;
- Feasibility of off pipe storage to reduce peak flows;
- Use of an appropriate peak flow factor that decreases as average daily flow to be conveyed increases.

6.10 MULTIPLE PURPOSE PROJECTS

A multiple purpose project should be considered as one that is designed to meet enforceable requirements of the CWA (i.e., NPDES permit or ground-water criteria), but that also has components not associated with enforceable requirements of the Act.

Projects designed only to meet an enforceable requirement are considered single purpose. Thus, a project that includes land application as an integral part of a wastewater treatment system to meet effluent limitations is considered single purpose. An agricultural reuse project that uses effluent that could be discharged to a stream, i.e., discharge meets NPDES limitations, is considered multiple purpose.

To reduce costs and conserve energy, the facilities plan may contain a broad examination of structural and nonstructural alternatives that include multiple purpose options. Section 7.0.4 discusses the identification of allowable costs for multiple purpose projects.

CHAPTER 7

EVALUATION OF PRINCIPAL ALTERNATIVES AND PLAN ADOPTION

After developing feasible alternatives as described in Chapter 6, systematically screen them to identify those capable of meeting Federal, State and local criteria (Section 6.4). Analyze the resulting principal alternatives to identify those which have cost-effective potential.

A computer assisted procedure for the design and evaluation of wastewater treatment systems (CAPDET) can be used to quickly evaluate costs of a large number of alternatives. CAPDET can also evaluate upgrading and expansion of wastewater treatment facilities, estimate user charges, and rank alternative treatment systems by present worth, capital, total project, energy, and O&M costs. These costs can be used in a preliminary evaluation of the financial impact on the users and community. User assistance is available from the CAPDET Clearinghouse at Mississippi State University. You should also apply the financial impact criteria to identify expensive projects (Section 7.2).

Principal alternatives selected through this screening process will undergo a thorough cost-effectiveness analysis. The level of detail in your analysis depends upon the size and complexity of your project. In the facilities plan discuss the reasons for the selection of a preferred alternative and the reasons for the elimination of other alternatives. The following sections describe in greater detail the screening criteria for plan selection.

7.0
EVALUATION OF MONETARY COSTS

Calculate present worth or equivalent uniform annual costs for each principal alternative in order to make a valid comparison of future capital and O&M. "Present worth" is the sum which, if invested now at a given rate, would provide exactly the funds required to make all future payments. "Equivalent uniform annual cost" is the expression of a nonuniform series of expenditures as a uniform annual amount. Either of these methods may be used. Detailed procedures for making these calculations are explained in most engineering economics textbooks.

The discount rate to be used for facilities planning begun in fiscal year 1982 (October 1, 1981 to September 30, 1982) is 7 5/8 percent.

Three examples are shown in Appendix E and include: a project assuming varying O&M, staged construction and salvage value; a project using an onsite alternative; and a project using land application.

You should calculate costs on the basis of market prices prevailing at the time of your cost-effectiveness analysis. The analysis should not allow for inflation of wages and prices, except those for land and energy (Section 7.0.2). This is based on the assumption that prices, other than the exceptions, for resources involved in treatment works construction and operation, will tend to change over time by approximately the same percentage. Changes in the general level of prices will not affect the comparison of alternatives in the cost-effectiveness analysis; they may, however, affect your community's ability to fund the project.

Your analysis should include all costs (capital, annual and other direct costs such as disruption of business due to street work or the market value of publicly owned land that could be used for purposes other than wastewater treatment) that are attributable to the construction and operation of your treatment works. Capital costs include building the wastewater treatment facility, interceptor sewers, pump stations, collection sewers; lease, easement or fee acquisition of rights-of-way and sites; relocation; and other costs.

Interest during construction should be computed in one of two ways. If expenditures are uniform and the construction period is less than 4 years, interest is computed by taking one-half of the product of the construction period (years), the total capital expenditures ($) and the discount rate. Otherwise, the interest should be calculated on a year-by-year basis.

Costs for O&M including labor, utilities, materials, outside services, expenses, and replacement of equipment and parts to ensure effective and dependable operation during the planning period, should be included in the cost-effectiveness analysis as annual costs. These costs usually include both fixed and variable costs depending on the quantity of wastewater that is collected and treated. Another type of annual "cost" is the revenue which you may receive from your treatment works through energy recovery, crop production or other byproducts. You should subtract this amount from the annual O&M cost in your cost-effectiveness analysis.

Your cost-effectiveness analysis should also consider the treatment works salvage value which is its worth at the end of the planning period. This value is based on a straight-line depreciation from the market price at the time of analysis to the end of the planning period (except for land as noted in Section 7.0.2). You should use the following periods for the useful life of the treatment works components:

o Land--permanent;

o Wastewater conveyance structures (collection systems, outfall pipes, interceptors, force mains, tunnels, etc.)--50 years;

o Other structures (plant buildings, concrete tankage, basins, lift station structures, etc.)--30 to 50 years;

o Process equipment--15 to 20 years;

o Auxiliary equipment--10 to 15 years.

For interim facilities with an anticipated useful life of less than 20 years, salvage value should be based on demonstrated resale or reuse opportunities at the end of the period of interim use.

Once the present worth or equivalent uniform annual cost is determined for each principal alternative, the cost-effective alternative can be identified.

There is also a cost preference for projects involving alternative technology. Section 7.0.3 gives additional guidance and summarizes the procedures for application of the cost preference in the analysis.

7.0.1
SUNK COSTS

Any investments or commitments made before or during facilities planning are regarded as sunk costs. As sunk costs they should not be included in the cost-effectiveness analysis because they have already been committed regardless of the alternative selected. Such investments and commitments include:

o Investments in existing wastewater treatment facilities and associated lands even though incorporated in the plan;

o Outstanding bond indebtedness;

o Cost of preparing the facilities plan.

7.0.2
COST ESCALATION FACTORS FOR ENERGY USE AND LAND

Energy prices should be escalated for the appropriate fuel, region and time period as shown in Appendix D of this book. Factors for vehicle fuels may be considered proportionate to the factor for distillate oil plus State vehicle fuel taxes. You should consider the applicable provisions of existing State energy plans during facilities planning but should not delay if a plan is not available.

Land prices should be escalated at a uniform rate of 3 percent per year except for right-of-way easements which do not appreciate.

You may use different escalation figures if justified and based on historical data for your area.

7.0.3
ALTERNATIVE TECHNOLOGY COST PREFERENCE

If a proposed publicly owned system includes alternative technology components, use the following procedure to apply the 15 percent cost preference.

a. Calculate the present worth of the conventional components of the proposed alternative system.

b. Using the total present worth of the proposed alternative system, calculate the percentage that the conventional components represent.

c. If the present worth of the conventional components is more than 50 percent of the total present worth of the proposed alternative system:

    (1) Calculate the present worth of the least costly conventional system components or equivalent portion of the treatment process being replaced;

    (2) Multiply the present worth cost of (1) by 1.15;

    (3) Add the result of (2) to the present worth of the remaining components of the least costly conventional system.

d. If the present worth of the conventional components represents 50 percent or less of the total present worth of the proposed alternative system, multiply the total present worth of the least costly conventional system by 1.15.

Result: The total present worth of the proposed alternative system should be less than the result of c.(3) or d. above to be considered cost effective.

Example 4 in Appendix F shows the application of the alternative technology cost preference.

7.0.4
ALLOCATION OF COSTS FOR MULTIPLE PURPOSE PROJECTS

Multiple purpose projects combine water pollution control practices meeting the enforceable requirements of the CWA with other purposes (e.g., agricultural, energy generation or recreation). Generally, when projects involve multiple purposes (Section 6.10), the allocation of costs to each purpose will be based on the Alternative Justifiable Expenditure (AJE) method as described in Appendix O.

However, if a multiple purpose project is the most cost-effective way of satisfying enforceable requirements (e.g., for CSO's), it should be treated as a single purpose project to determine grant eligibility. If the project is cost effective, it is the preferred alternative regardless of what other purposes it serves. When determining cost effectiveness, apply the alternative technology 15 percent cost preference.

Also, multiple purpose projects that combine wastewater treatment with recreation do not need to use the AJE method but can be funded at the level of the most cost-effective, single purpose alternative. Incremental costs of the recreation component that exceed the most cost-effective, single purpose alternative cannot be grant funded.

To determine what percentage of a project with recreation purposes is allowable, you should calculate the grant eligibility percentage by dividing the present worth of the cost-effective pollution control alternative by the present worth of the multiple purpose project, and multiplying the result by 100. Another simpler means of determining allowable costs can be used for proposed projects that involve clearly separate recreational components that are part of an otherwise single purpose project. Here the allowable cost simply equals the total capital cost of the single purpose components.

To determine the grant assistance for each component of a multiple purpose project, multiply the cost of the component by the allowable percentage determined by the appropriate cost allocation method. The resulting amount is then multiplied by up to 75 percent for a non I&A component and up to 85 percent for an I&A component. Funding of up to 85 percent for I&A technology is limited to project portions specifically identified as I&A unit processes, I&A unit operations, or other components uniquely necessary for proper functioning of the I&A components.

Revenues generated by multiple purpose projects ordinarily should not be deducted from costs in either cost-effectiveness comparisons with single purpose projects or in cost allocations. However, some projects involving revenues from cogeneration of energy in the form of steam or methane may qualify for a limited exception. If an energy cogeneration project involves the sale of energy rather than its reuse within the plant, then anticipated revenues may be used in cost calculations up to a maximum of the net value of energy (revenue less cost of plant reuse) that reasonably could have been reused within the wastewater pollution control components of the proposed project.

7.1 ADDITIONAL CAPACITY

Although you may propose additional capacity beyond the allowable reserve (Section 5.5), it is not grant fundable. After October 1, 1984, grant assistance will only include costs for the capacity required at the time of grant award, not in excess of needs as of October 1, 1990. After identifying the cost-effective alternative, you should address the proposed "additional capacity" alternative in the same detail. Special emphasis should be placed on the environmental impacts, including indirect impacts, of the proposed project.

The allowable cost is equivalent to the estimated construction costs of the most cost-effective treatment works (conveyance and treatment plant). Estimate the costs of construction of the additional capacity alternative and the cost-effective alternative on a consistent basis. You should use recent cost curves published by EPA, Office of Water Program Operations (i.e., MCD-10, MCD-53, FRD-11, FRD-21, FRD-22) to determine the cost ratios between cost-effective project components and those of the additional capacity project. Multiply your cost ratios by the construction contract costs for the additional capacity alternative to determine the incremental eligible costs of the additional capacity.

Although grant assistance only funds a portion of the project, the review and approval process will be the same as for a fully allowable project. If the environmental impacts of any portion of the project are unacceptable, grant assistance will not be awarded for any project costs.

When you receive the grant offer, it may include special grant conditions to protect the Federal government from any further claim due to additional capacity. Note that the user charge system applies to the entire project including the part providing the additional capacity.

7.2 DEMONSTRATION OF FINANCIAL CAPABILITY

To ensure proper construction, operation, and maintenance of treatment facilities, it is essential that the community be able to raise sufficient capital and operating revenue.

The facilities plan includes a monetary analysis of the total resource cost of the principal alternatives. In addition, an explicit analysis of the financial constraints that limit a community's ability to finance, operate and maintain the facilities performed early in the planning process can be an effective screening tool in the cost-effectiveness analysis, and can meet the requirement to demonstrate your financial capability for the useful life of the project as a part of your grant application. During facilities planning this estimate of financial capability will ensure that the local government agencies and residents are aware of their total financial obligation. These financial costs are identified for the selected plan and should be presented at a public meeting.

A financial capability analysis will help answer six key questions:

o What is proposed in the facilities plan?

o What roles and responsibilities will local government have?

o How much will the facilities cost at today's prices?

o How will the facility be funded?

o What is the average annual cost per household?

o What is the community's financial capability?

The identification of the costs to the community, reflected in the charges to customers, includes user charges and other costs such as debt service on any existing system, debt service on the local share of new capital costs (you should use actual or expected interest rates when calculating debt service), annual O&M (including replacement) costs, and connection charges (Section 7.0).

Analysis of the financial characteristics of a community can include existing debt, revenues, assessed value of property, median household income, income distribution, rate of population growth, bond ratings, existing sewer system charges, planned capital expenditures, and other factors and trends. The analysis is applicable to community systems and communities that are party to an intergovernmental agreement (Section 8.5.1).

Information on these costs should be developed as part of the draft plan of operation (Section 12.4) and user charge system (Section 12.2) required before a Step 3 grant will be awarded.

To assist you in this analysis an example summary information sheet is included in Appendix E of this book. Your State may have modified this sheet to better reflect local conditions. In any case, the information on the sheet you use will accompany your eventual application for a Step 2+3 or Step grant to demonstrate your community's financial capability. You should revise the information to reflect improved cost estimates and current community financial characteristics after design.

The financial capability analysis is especially important to determine a small rural or semirural community's ability to pay project costs (Section 7.2.1). The recently published Financial Capability Guidebook is available from EPA to further assist you.

Projects that appear to be expensive should receive careful review. We suggest that the criteria below be used to help identify expensive projects regardless of when the project was initiated. Calculate total annual charges to customers (after Federal and other funding is determined) for wastewater facilities. Include debt service, connection costs, and O&M. EPA considers the project expensive when the total annual costs exceed the following percentages of annual household median income (1980 dollars):

1.0% When median income is under $10,000.

1.5% When median income is between $10,000 and $17,000.

1.75% When median income exceeds $17,000.

(Use the consumer price index to adjust income data from other years and the dollar ranges in the table to the year of your most recent cost estimates, or adjust project cost and household income to 1980 values. See Appendix F).

Where identifiable, you should also consider the effects of projected charges to customers in areas with household incomes below the poverty level. If your project appears likely to be expensive, you should also:

o Review the cost-effectiveness analysis to ensure that lower cost alternatives have not been overlooked and that estimates are adequate and accurate;

o Determine whether high costs are due to water quality limitations and requirements of advanced treatment processes. If so, reconsider alternatives;

o Review soundness of local share financing of project;

o Pursue other funding sources.

It may be possible to reduce the local share of capital costs by using funds available from State and Federal agencies, such as Farmers Home Administration and Housing and Urban Development. Requirements for funding from other agencies' programs will vary and some communities may not qualify. A thorough investigation during facilities planning of all possible sources of funding will ensure that the local share is available. Be sure you have a firm commitment from any funding source.

7.2.1
ASSURING LOW COST PROJECTS FOR SMALL COMMUNITIES

Per capita costs for conventional sewerage projects are frequently higher in small communities (flows less than 1 mgd) partly because of the size and distribution of their population. Small communities have fewer financial and management resources from which to draw. These circumstances make it critical that low cost, especially low O&M cost, technologies be selected. You can use the following two-phase screening to help select the technology for your project. The first phase determines the technology selected and exempts from further review those that involve one or more of the following:

o Onsite and cluster systems;

o Facultative ponds;

o Overland flow land application;

o Trickling filters;

o Rehabilitation, expansion or upgrading of any of the above;

o Upgrading the operation, maintenance, and management of existing facilities as an alternative or supplement to construction of new facilities.

The second phase of screening involves an operability assessment and the application of problem project indicators. (Projects in the construction stage as well as operating projects should also undergo a financial capability analysis if not performed previously.) The operability assessment evaluates the operational and maintenance requirements of alternative treatment systems in the context of the community's institutional structure and its financial and management capabilities. Such an evaluation can point to the need for a simplification of the proposed technology, for improvements in the community's management capability, or both. Useful information for conducting such an evaluation can be found in the Wastewater Utility Management Manual which will be available in the fall of 1982.

The following indicators should also be used to determine if there is a potential problem with the project.

o Selection of an energy-intensive or sophisticated mechanical treatment facility for a small community (O&M costs that exceed $50 per household per year);

o Abandonment of existing low O&M cost facilities (including onsite systems);

o Sewering of rural, sparsely developed areas (collector system lengths greater than 80 feet per household);

o Unrealistic or incomplete cost estimates in the facility plan;

o Increases in capital or O&M cost estimates that exceed those derived using appropriate cost indexes;

o Questionable need for all or part of the project;

o Permit requirements not justified by sound standards and wasteload allocation;

o Short payback period for bonds or loans (less than 20 years);

o Higher bond or loan interest rates than those originally used in estimating household costs;

o High up-front, one-time fees (greater than $1,000);

o Total annual user costs exceed a certain percentage of median household income (see Section 7.2);

o High percentage of households with income in the poverty range;

o Lack of investigation of alternative or additional funding sources;

o Projected population growth rate that exceeds 1.5 times the previous population growth rate or projected population growth over the planning period that exceeds 30 percent of the existing population;

o Widespread homeowner opposition after project costs are discussed during public participation.

If a potential problem is detected using these indicators, the grantee should perform a detailed review as outlined in Section 7.2, as well as a review of the need for and scope of the project.

7.3
CAPITAL FINANCING PLAN

The project for which you request grant assistance may not be the only project addressed in your facilities plan (e.g., staged construction of a larger project that will satisfy future needs). Other projects in your jurisdiction, other facilities plans, or other non-Federally funded wastewater treatment projects may represent future financial obligations to be borne by you or the system users. For this reason, you are encouraged to prepare a capital financing plan as a part of your facilities plan which recognizes the cost relationship between your proposed project and future wastewater projects. The capital financing plan should contain:

- o A projection of the future requirements for waste treatment services within your jurisdiction for a period at least 10 years;
- o A projection of the nature, extent, timing and costs of future expansion and reconstruction of treatment works which will be necessary to satisfy your future requirements for waste treatment serivces; and
- o The specific manner you intend to use to finance the future expansion and reconstruction.

7.4
ENVIRONMENTAL EVALUATION

Carefully evaluate the environmental impacts of principal alternatives as described in Section 3.2. Evaluate the adverse and beneficial, direct and indirect, short-term and long-term, monetary and nonmonetary impacts on the natural and human environment. Identify measures to mitigate adverse impacts, identify any unavoidable impacts and consider the irreversible and irretrievable commitments of resources associated with each principal alternative.

7.5
EVALUATION OF RELIABILITY

Evaluate each alternative for its reliability, i.e., ability to meet and maintain effluent limitations. The selected plan will be able to consistently meet these requirements throughout the planning period.

7.6
EVALUATION OF ENERGY REQUIREMENTS

Include an analysis of energy requirements for each alternative system considered in your facilities plan. The selected plan should propose to reduce consumption or increase recovery of energy where cost effective. Energy reduction or recovery is one of the important aspects of I&A technology and your energy analysis should be integrated into your consideration of I&A technology. Where State energy plans exist, the analysis should also consider the recommendations of these plans.

7.7
EVALUATION OF IMPLEMENTABILITY

Evaluate alternatives for their implementability taking into account legal, institutional and financial constraints. Ensure that all jurisdictions find the selected plan acceptable and equitable (Section 8.2). Pay particular attention to financial management provisions of intermunicipal service agreements.

7.8
EVALUATION OF RECREATIONAL OPPORTUNITIES

Include in your facilities plan an analysis and description of potential opportunities for recreation, open space and access to bodies of water. Evaluate the recreational potential of the selected treatment plant site and collection system. You should base the analysis on existing data or evaluation of the sites. The analysis need not require extensive new data collection or surveys to determine suitability. The level of detail needed to produce a good recreational use analysis in a facilities plan depends upon the size of the community, the facility, and the suitability of the chosen site for recreation.

You should provide sufficient detail to determine the site's potential recreational uses. Show you considered the recreation elements of approved WQM plans. You should also coordinate with State and local recreation programs. Additional information may be found in the State Comprehensive Outdoor Recreation Plan or from the National Park Service of the U.S. Department of the Interior. Potential recreation benefits associated with wastewater projects include:

- o Use of interceptor rights-of-way for running or hiking paths, bicycling or equestrian trails;
- o Use of roadway to facilities for access to waterways for canoeing, boating, fishing or swimming;
- o Provision for access to natural areas for camping, photography or nature appreciation;
- o Use of project sites for sports such as target shooting or field sports;
- o Use of facilities or sites for educational or information purposes;
- o Recreational opportunities at offsite locations such as application of effluent or sludge to improve other recreational areas.

Multipurpose projects that include recreation may also be considered by coupling facilities planning activities with recreation planning. The allowable costs of multipurpose projects are limited to the costs of the least costly, single purpose pollution control project; but inclusion of recreation opportunities in the plan can effectively enhance public support while not significantly increasing the local share of project costs.

7.9 COMPARISON OF ALTERNATIVES

Review, summarize, and compare the costs, primary energy requirements, environmental impacts, implementability and other significant factors of the principal alternatives. Figure 4 is a sample of a tabular comparison that may be used effectively for public presentations. Where quantification is not possible, brief descriptions will serve. The visual display should allow comparison of alternatives at a glance so it can be used at public meetings. One alternative should be the "no action" alternative.

You should conduct a midcourse review with your reviewing agency to ensure that all alternatives have been adequately considered, that the results of the environmental analyses are available, and that the applicable State, local, and Part 6-related public information requirements have been met.

7.10 VIEWS OF THE PUBLIC AND CONCERNED INTERESTS

A public participation program should be an integral part of the facilities planning process (Section 3.1). A section or chapter of the facilities plan should describe

FIGURE 4. COMPARISON OF PRINCIPAL ALTERNATIVES

Type of Impact	Alternatives			
	#1	#2	#3	#4
Monetary Cost				
Capital Cost ($)				
Annual O&M Cost ($)				
Total Present Worth ($)				
Cost/Household Unit ($)				
Environmental Impact				
Cultural Resources				
Floodplains & Wetlands				
Agricultural Lands				
Coastal Zones				
Wild & Scenic Rivers				
Fish & Wildlife				
Endangered Species				
Air Quality				
Water Quality & Uses				
Noise, Odor, Aesthetics				
Land Use				
Energy Requirements				
Recreational Opportunity				
Reliability				
Implementability				

SAMPLE FORMAT

Legend:

++	Significant beneficial impact
+	Minimal beneficial impact
o	No impact
-	Minimal adverse impact
--	Significant adverse impact

and summarize the public participation program including public meeting rogram including public meeting comments and your responses. Letters submitted by individuals, groups or agencies should be appended to the plan. Where significant issues surface at meetings or in correspondence, the plan should indicate the appropriate response or action taken, justify controversial findings, or be revised.

EPA recommends holding a public meeting before the facilities plan is formally adopted and submitted to your reviewing agency. The preferred plan and alternatives should be presented at the meeting for public review and comment. Also, submit the draft facilities plan for review and comment by the areawide clearinghouse. After the meeting has been held and comments received, local officials may adopt the facilities plan for the proposed project. You should include a final responsiveness summary and responses to significant comments in the final facilities plan.

CHAPTER 8

SELECTED PLAN, DESCRIPTION AND IMPLEMENTATION ARRANGEMENTS

8.0

JUSTIFICATION AND DESCRIPTION OF SELECTED PLAN

In a brief narrative you should summarize why the plan was selected. Demonstrate that the plan is the most cost effective and is environmentally sound. Describe the treatment works and the complete wastewater treatment system in detail. Cover all elements, including service areas, collection sewers, onsite systems, interceptors, treatment works and ultimate disposal of effluent, sludge and septage. You should use maps to show locations of major components, existing and proposed, including locations of any individual systems proposed for grant assistance. The plan should clearly name project segments, implementing authority and approximate construction schedule.

8.1

DESIGN OF SELECTED PLAN

You should present preliminary design data in the plan to demonstrate that all major components of the system have been included, the cost estimate is adequate and reasonable, and the facilities can meet effluent limitations. The level of detail of the preliminary design varies from project to project depending on the project's complexity. For example, standard package plants will not require the same degree of detail as a pure oxygen system with phosphate removal and sludge incineration. Discuss the appropriate level with your project reviewer.

Preliminary design data for treatment facilities should include a simple tabulation (one or two pages) of information such as:

- o A description of the major features;
- o Unit processes and sizes;
- o A schematic flow diagram for treatment plants and plant and pumping station siting;
- o Sewer lengths and sizes;
- o Proposed design criteria, including detention times, overflow rates, process loadings, removal efficiencies, initial design flow, and reserve capacity;
- o Schedule for completion of design and construction.

8.2
COST ESTIMATES FOR SELECTED PLAN

The facilities plan provides cost estimates for design, building, and operation and maintenance of the selected plan. Include an estimate of total project costs and average annual charges to customers, as described in Section 7.2. You should also include a statement on the availability and estimated costs of sites for the proposed facilities and their availability (Section 8.6).

8.3
ENERGY REQUIREMENTS OF SELECTED PLAN

Describe features of the selected plan that conserve, recover or reduce energy consumption. For systems that claim innovation on the basis of energy reduction (translated into cost savings), the plan should contain a detailed energy analysis.

8.4
ENVIRONMENTAL IMPACTS OF SELECTED PLAN

The facilities plan discusses how the treatment works will comply with all pertinent requirements of applicable Federal, State and local environmental laws and regulations.

Unless your project has been granted a Categorical Exclusion, the facilities plan will describe the existing environment and relevant direct and indirect impacts of the selected plan. Emphasize:

- o The selected plan's unavoidable adverse impacts, especially on environmentally sensitive areas;
- o The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term environmental productivity, such as temporary disruption of farming by land application of sludge;
- o Irreversible and irretrievable commitments of resources; and
- o Mitigation of unavoidable adverse impacts.

The description emphasizes indirect impacts on environmentally sensitive areas, present and future actions to protect these areas, and assures that interceptors conform with approved WQM plans and EPA's objectives for minimizing indirect impacts on environmentally sensitive areas.

8.5
ARRANGEMENTS FOR IMPLEMENTATION

8.5.1
INSTITUTIONAL RESPONSIBILITIES

The facilities plan demonstrates that the implementing authority has the necessary legal financial, institutional and managerial resources to ensure the building, operation and maintenance of the project. Where responsibility for implementation rests with more than one agency, agreement between agencies will be required as part of the application for grant assistance.

To describe the arrangements for implementation adequately, the plan should:

o Identify each agency and its responsibility;

o Demonstrate that each agency has the ability and authority under State law (or reasonable expectation of obtaining such authority) to finance, design, construct, acquire access, operate and maintain those facilities within its jurisdiction;

o Identify any referendums or public elections necessary to implement the plan;

o Include adopted resolutions of plan acceptance and agreements among jurisdictions; and

o Identiiy jurisdictions that oppose or have failed to approve the plan and describe steps necessary to reach agreement.

The intermunicipal agreement should:

o Include proposed formula for allocating the local share of capital costs (based on flow, or flow and strength, etc.);

o Identify the cost basis for regional allocation, such as value of existing facilities; value of land; periodic capital requirements for expansion; and costs for operation, maintenance, replacement, and administration;

o Identify the procedures for administration and management of the agreement including cost accounting and records management systems; and

o Include financial arrangements that obligate each jurisdiction to enforce the requirements for user charges, sewer system rehabilitation and sewer use ordinance.

The requirements for an intermunicipal agreement may be waived if you can demonstrate:

o That an agreement is already in place; or

o Evidence of historic service relationships for water supply, wastewater, or other services in the absence of the existence of formal agreements; or

o That the financial strength of the supplier agency is adequate to continue the project, even if one of the proposed customer agencies fails to participate.

The facilities plan should include a schedule of specific actions to implement the plan and to meet its objectives on schedule. The dates in this schedule should correspond to compliance dates specified in your NPDES permits (if applicable). Resolve differences that would result in failure to meet the compliance schedule, including, if necessary, a formal request through the reviewing agency for extension of compliance dates.

Some capital expenditures could be met through creative financing techniques using special improvement districts, industry assistance to local governments, or intergovernmental agreements. The institutional arrangements will have a strong influence on the feasibility of alternatives. You should structure those arrangements to ensure your community will continue to meet these financial eligibility requirements described above.

The financial and institutional arrangements provide the project reviewer with a starting point in an overall financial assessment. A schedule for marketing bonds and developing a user charge system can be developed during facilities planning. These dates should be adjusted as necessary during subsequent design and building of the project.

8.5.2
CIVIL RIGHTS COMPLIANCE

Comply with the requirements of the Civil Rights Act of 1964 and EPA regulations (40 CFR Part 7). Include in your facilities plan a statement that these requirements have been met. Where minority areas are included in the facilities planning area, show in the plan that such areas will be served or excluded from service only for cost-effectiveness reasons.

8.5.3
OPERATION AND MAINTENANCE REQUIREMENTS (O&M)

The facilities plan should contain a brief but accurate summary of the personnel, procedures and budget that are necessary to operate, maintain and manage the proposed treatment works (including sewers and pump stations). If an existing plant is to be upgraded or expanded, existing staffing, O&M policies and budget should be reviewed and updated as necessary to assure a sound O&M program. Note that the O&M funds include funds for the replacement of equipment required during the useful life of the project. Your program should also include a sewer maintenance program (Section 5.4.1).

Where a completely new treatment system will be constructed, a more detailed O&M discussion should be included in the facilities plan.

A list of items to include in an O&M discussion is as follows:

o Required annual O&M budget (fixed and variable costs);

o Staffing (number and certifications);

o Training (based on available personnel);

o Laboratory requirements (for sampling and process control);

o Special maintenance requirements;

o Special operating requirements (cold climate restrictions, etc.);

o Residuals disposal (sludge, incinerator ash, etc.).

Although O&M costs (except for startup costs) are not allowable, your cost estimates are needed in your cost-effectiveness analysis and to determine charges to customers. O&M considerations are discussed further in an EPA publication "Operation/Maintenance/Management Program Guidance, Fiscal Year 1982."

8.5.4
PRETREATMENT PROGRAM

Where your treatment facilities serve or will serve nonresidential customers, you may decide it is necessary to develop a pretreatment program in accordance with the NPDES permit program requirements.

A pretreatment program is intended to control pollutants from nonresidential sources in order to allow for the reclamation and reuse of wastes wherever practicable. The objectives are:

- To prevent the introduction into the treatment plant of pollutants that will interfere with plant operation or disposal or use of municipal sludge;
- To prevent the introduction into the treatment plant of pollutants that will pass through the plant into receiving waters or that will be otherwise harmful; and
- To recycle and reclaim wastewater and sludge produced by wastewater treatment where possible.

When a pretreatment program is necessary, the facilities plan should include a schedule of actions to implement the program. A document "Municipal Pretreatment Program Guidance Package" is available from Municipal Technology Branch (WH-547), USEPA, Washington, D.C. 20460, (202) 426-8976.

A complete and approvable pretreatment program should include the following:

- A survey that identifies system user by type and location and the character and volume of pollutants dicharged;
- An evaluation of the legal authority for control and enforcement including adequacy of enabling legislation and selection of mechanisms to be used (e.g., ordinances, codes);
- A determination of technical information needed to support development of an enforcement mechanism to ensure compliance with NPDES permit conditions;
- An evaluation of revenue sources and financial programs to ensure adequate funding to carry out the pretreatment programs;
- The design of a monitoring enforcement program;
- A determination of pollutant removals in existing treatment facilities;
- A preliminary determination of monitoring equipment required at the treatment facilities;
- A determination of tolerance of the treatment facilities to toxic pollutants; and
- A preliminary determination of the municipal facilities' need for monitoring or analysis of nonresidential wastes.

8.6
LAND ACQUISITION

8.6.1
GENERAL ACQUISITION CONSIDERATIONS

As an integral part of your cost-effectiveness analysis, you should identify:

- The most suitable land for the project (e.g., size, soil conditions, slope, location); and

- The most appropriate way to secure the rights in the land (fee simple, total ownership, easement, ownership of some rights, lease, certain rights for a period of time) or "no cost."

Acquisition of any interests in real property will comply with EPA regulations (40 CFR Part 4) implementing the Uniform Relocation and Real Property Acquisition Policies Act (PL 91-646).

Your project will be evaluated to determine if you have sufficient rights to the project land and to ensure undisturbed construction and operation of the project for its useful life.

Acquisition of land including easements should be initiated as soon as possible. For land to be grant eligible you need written approval of the price or grant award prior to making an offer to acquire. All land should be acquired, option taken or formal condemnation proceedings begun before initiating building of the project.

You should use professional staff to appraise, negotiate or condemn land. Consider contracting with State or Federal land acquisition agencies if you do not have these capabilities. Use "The Uniform Appraisal Standards for Federal Land Acquisition" (GPO 052-059-000-20). See Appendix G for supplemental information.

Obtain reviewing agency approval that the appraised value represents the fair market value of the property. The reviewing agency should contract appraisal review if it does not have qualified in-house staff. You should not negotiate with the land owner prior to the Regional Administrator's approval of the price to be offered. Some modest increase above the appraised value may be paid to avoid the cost, time, and public relations problems involved with condemnation if approved by the Reginal Administrator.

8.6.2
"NO COST ARRANGEMENTS"

Acquisition of land required for sludge application may not be necessary; only the right to use the land for this purpose needs to be secured. Communities can manage sludge and effluent by making arrangements with a group of farmers willing to accept sludge and effluent on an intermittent basis. Carefully conceived sludge and effluent application arrangements of this nature can provide for disposal, but the cost of land is not allowable for grant participation because the community does not actually acquire any interest in the property itself.

8.6.3
ACQUISITION METHOD AND APPROVAL

Certain land costs such as lease, easement or fee simple purchase are allowable for grant participation. The method of acquisition depends on cost effectiveness, public acceptability, feasibility and local circumstances.

A combination of public and private land ownership may be the best solution, i.e., the land required for preapplication treatment and seasonal storage might be publicly owned, while the irrigated land could be leased from a farmer.

Before you make an offer to acquire any rights in land for which you intend to request grant participation, you need to have your reviewing agency's prior written approval of the price. Early land acquisition with prior approval is considered a "preaward cost" and is eligible for grant participation in a future grant (Sections 13.2 and 15.3.1).

You may use your own property management standards and procedures for land that has been acquired in part or wholly with grant funds as long as they meet the minimum provisions of 40 CFR 30.810 et. seq. Record the government's interest in the title to the property.

Your lease or easement should contain conditions such as:

o Limiting the purpose to land application or sludge (residuals) management and complementary purposes and describing that use;

o Waiving the landowner's right to restoration at the termination of the lease/easement. (The government cannot be responsible for removing irrigation systems, draining and filling ponds, etc.);

o Landowner agreeing to apply a specified quantity of the community's wastewater or sludge to his land for a specified time span;

o Providing these conditions for the life of the project;

o Providing for your full recovery of damages in the event of premature lease termination.

A copy of the proposed leasing agreement (contract) and other supporting materials should be presented in your facilities plan.

8.6.4
ALLOWABLE LAND COSTS

Allowable land costs include:

o A reasonable amount of land including irregularities in application patterns, buffer areas, berms, dikes and similar uses where land is an integral part of the treatment process;

o Land for sludge disposal with application at the maximum rate possible (generally 5 dry tons per acre per year is considered minimum acceptable rate);

o Land required for the composting of sludge including its curing and temporary storage (if a program for use of the compost has been approved);

o A soil absorption system for a group of two or more homes provided that the municipality has complete ownership and beneficial use of the land;

o Ponds constructed specifically for temporary storage of treated wastewater prior to land application to meet seasonal imbalances between wastewater supply and application schedules. The total land area of the pond or cell constructed for combination treatment and storage purposes is allowable for grant funding if the storage volume is greater than the treatment volume. Otherwise, the grant fundable area will be determined by the ratio of the storage volume to the total volume of the pond.

-"Storage volume" is that portion of a pond or cell which retains water prior to the water's application to the land.

-"Treatment volume" is that portion of a pond or cell specifically designed for biological stabilization of the wastewater.

Ineligible land costs including existing treatment works are discussed in Appendix A to 40 CFR Part 35 Subpart I of the regulations.

CHAPTER 9

REVIEW OF FACILITIES PLANS

9.0 REVIEW AND EVALUATION

The timing of review, approval, and certification of facilities plans will vary from State to State. Although State certification that a facilities plan satisfies all regulatory requirements is not required until the submission by the State to EPA of a Step 3 grant application, you are strongly encouraged to have your project reviewer evaluate your facilities plan before beginning project design. This evaluation will help ensure that all Federal and State statutory requirements are satisfied and that the project to be designed will meet the prerequisites for grant assistance.

In addition to your reviewing agency's evaluation, you should also solicit comments on your completed facilities plan from the appropriate clearinghouse and WQM agency, if any. Agency review procedures and corresponding determinations of facilities plans are discussed in Section 9.2.

9.1 SUMMARY CHECKLIST

Summarized below are the major items you should consider during facilities planning.

Project Management

o Prepare plan of study.

o Conduct preplanning meeting with reviewing agency.

o Arrange for local funds or advance of grant allowance as appropriate.

- o Organize project team and designate municipal project manager.

- o Prepare public participation program.

- o Coordinate with WQM agency if applicable.

Facilities Plan

- o Population and flow forecasts.

- o Sewer System Evaluation, if applicable. Watch timing and obtain State agreement of results.

- o Possible use of generic plan for small communities (consult project reviewer).

- o Alternatives development:
  - Land application;
  - Small wastewater systems;
  - Centralized treatment;
  - Upgrading and optimal operation of the existing system;
  - Innovative and alternative technology;
  - No action.

- o Financial Capability Analysis.

- o Environmental assessment of alternatives as integral part of facilities plan.

- o Alternatives evaluation based on:
  - Costs;
  - Engineering feasibility;
  - Environmental impacts;
  - Public acceptance;
  - Implementability.

- o Public participation program.

Facilities Plan review by

- o WQM agency;

- o Clearinghouse (A-95);

- o State agency;

Critical Topics: Be sure the following areas receive close attention:

- o Detail of facilities plan;

- o Coordination with WQM agencies;

- o Population and flow forecasts;

- o Public participation;

- o Alternatives development and analysis, particularly low cost alternatives for small communities;

- o Effluent limitations;

- o Disposal of residuals;

- o Intermunicipal service agreements;

- o Pretreatment program;

- o Preliminary cost estimates;

- o O&M;

- o Financing and economic impact;

- o Financial capability.

Project Administration: Check on:

- o Filing system;

- o Accounting records;

- o Force account.

9.2 AGENCY REVIEW

While a review of your completed facilities plan is not required until submission of your application, you are encouraged to request such a review prior to undertaking project design. In order for you to understand the actions required on the part of the State and the decisions to be made by EPA concerning the review and approval of your facilities plan, a brief description of these actions is provided below.

9.2.1 STATE REVIEW AND CERTIFICATION TO EPA

The completed facilities plan along with comments from the State and areawide clearinghouses and appropriate WQM agency is submitted to your State reviewing agency. The State will conduct its review and contact you for additional information, clarification or suggestions for change if appropriate. Upon resolution of any problems the State reviewing agency will certify to EPA (at the time of application submission) that the facilities plan:

o Conforms with the requirements of the construction grants regulations and applicable laws;

o Has been made available to the appropriate WQM agency for comment; and

o Conforms with approved WQM plans.

9.2.2 ADVANCED TREATMENT (AT) REVIEW

For AT projects with incremental capital costs greater than $3 million, EPA headquarters will conduct the review based in part on information submitted by the State or EPA regional office.

For AT projects with incremental capital costs of $3 million or less, the State or EPA regional office will conduct the review. Grant assistance may be awarded only after these reviews.

9.2.3 EPA ACTIONS UNDER NEPA

An application for grant assistance may only be considered after the regional administrator has completed the appropriate environmental document (40 CFR Part 6). If your project was not issued a Categorical Exclusion based on earlier coordination with EPA (Section 2.0), EPA will apply the criteria (Section 3.2.12) under the National Environmental Policy Act (NEPA) to determine whether an Environmental Impact Statement (EIS), or more commonly, a Finding of No Significant Impact (FNSI) should be prepared. The decision by EPA is based on:

o Your completed facilities plan where review of the facilities plan has not been delegated to the State; or

o The State's environmental assessment where the State has been delegated authority for facilities plan review; and

o Other documentation considered necessary by EPA to allow a determination.

If an EIS is not warranted, EPA will prepare and publish a FNSI (with a 30-day comment period). The decision not to prepare an EIS will be supported by an environmental assessment incorporated into or attached to the FNSI.

If EPA determines that significant adverse impacts which cannot be satisfactorily mitigated will result from your project, you will be notified prior to the publication in the Federal Register of a notice of intent to prepare an EIS.

EPA will prepare the EIS either by direct use of agency staff, or by contract with a consultant. When the need for an EIS is determined before completion of facilities planning, the joint EIS/EID approach can be used (Section 3.2.12).

The EPA regulations (40 CFR Part 6) outline detailed procedures and criteria to be followed in the process of EIS preparation. Grant assistance may not be awarded until a a final EIS has been prepared and all regulatory requirements have been met. However, action may continue on discrete segments of the project before the environmental review is complete, under certain conditions (Section 3.2.12).

PART II. DESIGN

CHAPTER 10

PREDESIGN

10.0 PREDESIGN CONFERENCE

A predesign conference with your reviewing agency after facility plan approval, while not required, is strongly recommended. The predesign conference will provide an opportunity to review Federal and supplementary State requirements for design as well as other grant application requirements. Examples of other requirements which might be discussed include:

o Field testing of innovative or alternative technology designs (Section 10.1);

o Value engineering review (Section 12.1);

o User charge system and sewer use ordinance (Sections 12.2 and 12.3);

o Timing and dollar amount of grant assistance (Section 13.5);

o Plan of operation (Section 12.4);

o Land acquisition (Section 8.6);

o Intermunicipal service agreements (Introduction-Managing Your Project);

o Pretreatment (Section 8.5.4);

o Reviewing agency's environmental review of project (Section 9.2.2);

o Sewer system evaluation (Section 5.4.1);

o Combination Step 2+3 grant (Introduction-Managing Your Project).

Prior to the conference you may wish to prepare a brief description of the activities you will perform during the design phase of your project. The description could be similar to the plan of study (Section 2.2) and address milestones, schedule and other aspects of your project.

One aspect of project design which should be clarified concerns the level of detail of the design work to be submitted to your reviewing agency. For example, some A/E's prepare design engineering reports which show the assumptions and calculations used to size various components of the treatment works. Items such as surface settling rates, weir overflow rates, detention times, pump system head curves, volume of various tanks, etc., are very often included in these reports. The reviewing agency may or may not wish to review the assumptions, design criteria and calculations prior to the preparation of the drawings. In any case, prudent project management suggests that a predesign conference take place and that all significant project design criteria be reviewed.

10.1
FIELD TESTING OF INNOVATIVE OR ALTERNATIVE TECHNOLOGY

The field testing of a proposed (I&A) technology project is intended to provide an additional increment of verification of its performance capability under the circumstances of use. Alternative technology processes or techniques (Section 6.4.1) are generally fully proven but may require verification for the particular application or unique circumstances associated with your project. Innovative processes or techniques, on the other hand, are developed but not fully proven under the circumstances of contemplated use, and field testing may be desirable to verify performance and/or refine design parameters.

The costs associated with field testing of proposed innovative or alternative (I or A) projects are allowable for grant participation (as a preaward cost) and in some cases may require the construction, lease or use of relatively large structures. Discuss this aspect with your project reviewer and ensure that there is agreement before proceeding.

Applications for proposed field testing should explain why the technology is not fully proven and demonstrate that full testing is needed to:

o Reduce the element of risk to an acceptable level;

o Increase confidence in the widespread use of the technology;

o Permit refinement and verification of design or performance criteria; and

o Achieve significant cost or energy (translated to cost) savings over conventional technology.

The size or scale of field testing necessary to demonstrate full development may range from pilot to full scale and should be determined by considering the following items.

o The size of the principal components are such that physical, chemical or biological processes are accurately simulated.

o Process variables normally expected in full-scale application are simulated.

o All recycle streams are considered.

o Variations in influent characteristics substantially affecting performance in full-scale application are anticipated and simulated.

o The time of testing is adequate to ensure process equilibrium.

o Full control of all major process variables is demonstrated.

o The service life of high maintenance or replacement items is accurately estimated.

o Basic process safety, environmental, and health risks are considered and found to be within reasonable limits.

o Type and amount of all required process additives are determined.

The program of field testing should be the most cost-effective approach reflecting practical and efficient use of existing facilities or newly constructed facilities. The field testing program should be of the smallest size and duration necessary to accomplish technical and economic feasibility objectives. Elements of project design that may be field tested include portions of projects that qualify as I or A technology based on the evaluation in your facilities plan and include complete systems, unit processes, proprietary equipment and devices or modifications and improvements of existing technology.

The results of field testing can be used to confirm final qualification of a system or selected components as I or A technology. A final design report for projects incorporating a field testing program should be prepared and submitted to the reviewing agency. The report should summarize the findings and include items such as scope and objectives, location of field test, duration, costs, variables, and the impact on design. Field testing should not be considered where its use would delay construction of needed facilities beyond dates necessary for compliance with NPDES permit schedules.

CHAPTER 11

DESIGN AND ADMINISTRATIVE CONSIDERATIONS

11.0
DESIGN CONSIDERATIONS

Treatment works are designed by an A/E registered in the State in which the project is to be constructed. In designing the treatment works the A/E will employ sound design principles and place his seal on the construction drawings and specifications. In addition, the A/E will employ State design criteria where applicable; however, based on past experiences, EPA has established several basic policies concerning the design of treatment works. These policies are not complete design standards and should be used only to supplement the State's design criteria.

11.0.1
PRETREATMENT AND NPDES PERMIT

Pretreatment in the context used in this book is directed only to nonresidential sources of wastes discharged into your treatment system. The objectives of pretreatment are to prevent the introduction of pollutants which may pass through or interfere with your treatment process or contaminate your effluent and/or sludge thereby limiting your options for disposal or reuse. Failure to attain any of the objectives may lead to a violation of your National Pollution Discharge Elimination System (NPDES) permit. During the facilities planning phase you will have had preliminary discussions with your reviewing agency concerning your NPDES permit. The permit for existing or proposed facilities will contain requirements for effluent or water quality limitations (i.e., the level of treatment you must achieve), a schedule for compliance with the permit conditions, and specific requirements for pretreatment necessary for your project. To satisfy these requirements it will probably be necessary to conduct investigations of the characteristics of the nonresidential wastes, prepare an evaluation of your legal authority for enforcement, establish administrative procedures, and identify financial sources to develop and implement your pretreatment program (Section 8.5.4). Pretreatment requirements will impact nonresidential contributors discharging into your system and possibly modify your project design and sewer use ordinance. If your project will treat wastes from nonresidential sources, it is recommended that you determine from your project reviewer the necessary actions to satisfy pretreatment requirements, if you have not already done so, during the design phase of your project.

11.0.2
WET AND DRY WELL CLASSIFICATIONS

Wastewater may generate explosive gases. In addition, volatile products, such as gasoline or industrial solvents, may be inadvertently or illegally introduced into the sewerage system. Where pumping is necessary, wastewater is generally stored, for a relatively short time, in a holding tank called a wet well where sewage gas or other volatiles may accumulate. The wastewater remains in the wet well until a control signal turns the pumps on and lowers the liquid level to a predetermined elevation. Pumps, motors, and electric equipment are sometimes located in the wet well and may represent an ignition source if explosive gases are present. Your design should take this hazard into account and include features to preclude the possibility of an explosion or possible injury of workers due to the inhalation of potentially toxic gases. Equipment located in wet and dry wells should be designed to minimize explosion and areas subject to buildup of gases should be ventilated. Classification of wet and dry wells as Class I and either Division 1 or 2 (National Electrical Code) should be made on a case-by-case basis and depends on the type of sewer system, the probability of hazardous gases being present, the intended use and the type of ventilation used.

Strict enforcement of the sewer use ordinance and the development of specific contingency plans (included in the O&M manual) to combat accidental or illegal discharge of compounds is encouraged. Guidance containing good engineering practice for design of wet and dry wells is contained in Appendix H of this book.

11.0.3
USE OF MERCURY

Mercury is a toxic and hazardous substance. It should be used with extreme care in trickling filter flow distributors and comminutor seals. Problems with conversion of older trickling filter rotary distributors from mercury seals to mechanical seals may require special consideration. If it is anticipated that significant additional cost, operating or maintenance problems associated with such conversions will arise, you should consult with your project reviewer. It may be determined after consultation and evaluation of other alternatives that continued use of mercury seals is the best solution. To prevent violation of Section 307(a) of the CWA you should submit a written request for use of mercury seals to your reviewing agency for approval. This request should address the following issues:

o Acknowledgement that all costs associated with the repair, replacement or modification of existing mercury seals when not replaced with mechanical seals are not grant eligible;

o Agreement to comply with all applicable provisions of the Toxic Substances Control Act and the Solid Waste Disposal Act;

o Acknowledgement that you can be held liable for any damages related to the discharge of mercury contaminated effluent or sludge;

o Establishment of a mercury spill monitoring program including an annual mercury inventory;

o Establishment of an emergency response program which provides for the safe disposal of effluent and/or sludge contaminated with mercury and a program for immediately notifying all downstream water users of possible mercury contamination;

o Modification of your NPDES permit to identify a potential mercury contamination hazard.

Mercury float switches have been used for several years with no reported failure where mercury was discharged to the wastewater. For that reason and since mercury float switches contain small amounts of mercury (usually less than 15 grams) those switches and other equipment containing similarly small quantities of mercury may be used in treatment works. It is anticipated that care will be exercised when specifying equipment using small amounts of mercury and consider items such as self-contaminment, leakproof, and corrosion resistance.

Reviewing agencies may specify additional considerations for assuring that applicable considerations have been addressed before approving construction drawings and specifications.

11.0.4
SHELLFISH WATERS

If your project proposes to discharge effluent into shellfish growing waters, the environmental impacts will have been assessed in your facilities plan or by your reviewing agency. The environmental assessment in all likelihood will have recommended measures to minimize the adverse impacts of the discharge upon shellfish. These recommendations should be carefully considered during project design. However, in addition to these recommendations the following considerations should be taken into account during the design phase of your project.

Reliability

Equipment, unit processes and the overall treatment process should be designed to provide a Reliability Class I (Section 11.0.13). In general, this reliability class defines the redundancy of system components or provision for adequate capacity when one component or unit process is out of service.

State Requirements

Discharge in close proximity to shellfish harvesting areas should be avoided wherever possible. State environmental protection authorities and shellfish regulatory agencies should be contacted for further design requirements if this is unavoidable.

11.0.5
CHLORINATION SYSTEMS USING GASEOUS CHLORINE

Chlorination continues to be the most common practice for disinfection of treated wastewaters prior to discharge. While chlorination is an effective disinfectant, it also presents potentially dangerous conditions when used improperly or accidentally leaked. In the worst case chlorine can cause death by suffocation or severe burns when brought in contact with skin and eyes. When combined with small quantities of water, chlorine can become highly corrosive. Therefore, chlorination systems should be designed to prevent chlorine leaks, to ensure the quick and safe handling of any chlorine leaks, and to minimize operator and local resident exposure.

The discussion below represents EPA's technical guidance and the basis for minimum adequacy in safety considerations and should be used to supplement (not replace) other safety requirements and regulations such as those published by the Occupational Safety and Health Administration (OSHA). This section deals with design considerations and represents good engineering practice.

Design Considerations

o Where chlorine or chlorination equipment is stored or installed in a building used for other purposes, a gas tight partition should separate the chlorination room from other parts of the building, doors should be equipped with panic hardware and open to the outside at ground level and storage and feed areas should be separated.

o A clear glass, gas tight window should be installed in the exterior door or interior wall of the chlorination room to permit viewing without entering the room.

o Chlorination rooms should be heated to 50°F and the chlorination feed equipment room 5-10°F higher; to avoid overheating above 140°F containers should be shielded from direct sunlight and stored with level rails or cradles designed for this purpose.

o Forced mechanical ventilation should provide a complete air change every 4 minutes with inlets and outlets at opposite ends of the room; exhaust outlets should be at floor level since chlorine gas is heavier than air.

o Exhaust equipment should be activated by external light switches or other automatic systems such as door activated mechanisms.

o Emergency showers and eye baths should be located external to, but close by, the chlorination room.

o An automatic chlorine detection system should be provided for facilities with capacity of 1 mgd or more and activate sound alarms, flashing lights, notification to operator's area or police department, or other measures to ensure emergency response. Smaller capacity treatment facilities should also consider use of detention and alarm systems where the benefits warrant the additional cost.

O&M Design Considerations

o Rail delivery of chlorine is to comply with Department of Transportation regulations (49 CFR 174.560) and, in general, provide dead-end sidings used only for chlorine delivery.

o Chlorine cylinders should be lifted with forklift trucks and other hoisting equipment equipped with special cradles or carriers designed for such purposes; chains, rope slings, or magnetic hoists should never be used.

o Tank barge unloading should comply with U.S. Army Corps of Engineers and Coast Guard regulations.

o One-ton cylinders should be stored on cradles or pairs of level rails. One hundred and 150-pound cylinders should be secured with safety chains, never be piled on top of one another nor stored with other compressed gases; empty containers should be tagged appropriately and stored separately from full cylinders; cylinder emergency repair kits should be readily available.

o Self-contained positive pressure headgear with self-contained compressed air supply and full face piece should be located away from areas likely to be contaminated but convenient and available for emergency use; additional (spare) air supply cylinders should be provided; and routine training, inspection and cleaning of emergency equipment should also be provided.

o Piping and valves in chlorine rooms should be color coded and labeled.

11.0.6

CHEMICAL STORAGE AND HAZARDOUS MATERIALS

All chemicals should be stored and curbed to hold the entire volume in the event of an accidental spill. In addition, adequate safety protection gear is to be provided for plant disposal of chemicals and hazardous materials may be subject to the provisions of the Resource Conservation and Recovery Act and the Toxic Substances Control Act.

Sewage Sludge

The storage, transport, and disposal of sewage sludge may be subjected to the hazardous waste regulations implementing the Resource Conservation and Recovery Act (Section 6.6). Regulatory agencies have generally not classified sewage sludge as a hazardous waste. Rather, it is up to each municipality to determine if its sludge is hazardous based on the types of industrial waste discharged into the system or by laboratory testing if deemed necessary. The characteristics of a hazardous waste include: ignitability, corrosivity, reactivity, extraction procedure (EP) toxicity. In general, the characteristic most likely to cause a sludge to be hazardous would be the toxicity level as determined by the EP test.

The results of the pretreatment studies conducted during or after facilities planning or the requirements of the NPDES permit program may require nonresidential dischargers to pretreat their wastes, eliminating those chemicals which could cause your sludge to be classified as hazardous. If it is possible that your sludge may be classified as a hazardous waste, you should contact your reviewing agency during design to initiate procedures for obtaining a permit as a generator, storer, transporter, and disposer of hazardous wastes.

11.0.7
SAFETY

The specifications will require contractor compliance with OSHA's regulations and applicable State requirements. In addition, the specific design considerations for chlorine systems, chemical storage and handling, and wet well classifications as described in earlier sections should be taken into consideration.

11.0.8
BYPASSING OF SEWAGE

Avoid bypassing of flows from sewers or treatment facilities during construction except where absolutely essential and with specific approval from your reviewing agency. Eliminate existing bypasses and include provision in new facilities for temporary storage and treatment of all flows. Any bypassing to the receiving stream is to be inclued in the NPDES permit.

11.0.9
PUBLIC WATER SUPPLY

Use backflow preventors to protect public water supplies from the possibility of contamination.

11.0.10
VENTILATION

Adequate ventilation should be provided to eliminate hazardous working conditions. Specific requirements for chlorine systems and wet/dry wells are given in Sections 11.0.2 and 11.0.5 of this book. Adequate ventilation should also be considered for chemical storage areas, buildings, laboratories, enclosed structures, and sludge handling and digestion areas.

11.0.11
LABORATORY FACILITIES

Laboratory facilities should be adequate to conduct sampling and testing required to properly control the treatment process, and to provide the report data required by the NPDES permit or reviewing agency. Alternatively, provision may be made for testing by commercial laboratories, universities or other treatment works equipped to perform the necessary tests.

11.0.12
EMERGENCY ALARMS

Emergency alarms should be provided to alert operators or other officials of malfunctions in system components. Highest priority should be provided to systems which endanger operator or public safety or cause a complete system failure resulting in discharge of inadequately treated sewage.

11.0.13
EQUIPMENT AND MATERIALS

Nonrestrictive Specifications

Specifications are to be written to encourage maximum, free and open competition. Specifications are not to contain proprietary, exclusionary or discriminatory requirements for structures, materials, equipment or processes other than those based on performance with two exceptions:

o Where it is necessary to provide for interchangeability of parts of equipment;

o Where it is necessary to test or demonstrate a specific thing (for example, innovative technology or techniques).

When in your judgment it is impractical or uneconomical to make a clear and accurate description of the technical requirements, a brand name or equal description may be used as a means to define the performance or other salient requirements. In so doing, you need not establish the existence of any source other than the brand or source so named.

With regard to materials such as pipe or chemical grout, it is not mandatory that two or more types of material be specified. In general, it is preferable to use performance specifications for materials based upon accepted nationally known standards. In the case of pipe, for example, these standards may be AWWA, USAS, ASTM, or Federal specifications and standards.

If it is necessary to use a restrictive specification which reflects minimum essential performance needs, you should justify its use in writing prior to the issuance of the specifications and be prepared to defend your justification in the event of a protest (Section 16.11).

Sole Source Procurement

Noncompetitive negotiation is allowed when it is necessary to test or demonstrate something specific (e.g., equipment or processes used in innovative technology designs) and with the prior approval of the reviewing agency. Noncompetitive negotiation may require the submission of a price or cost analysis. The analysis may include a review of direct costs (materials, labor, etc.), indirect costs (overhead, general, and administrative expenses), profit, and comparisons with other similar products or previous purchases of the same product. These costs are typically subject to audit.

Qualification of Major Items of Equipment

The qualification of major items of equipment before receipt of bids for construction is optional. This procedure may be used to ease the administrative burden of determining responsive, responsible suppliers on equipment. In all cases, the equipment furnished must comply with the specifications and qualified suppliers may be rejected as nonresponsive on the basis of subsequently furnished information.

The A/E prepares a qualification information package which contains enough specific detail regarding performance and quality to assure that equipment suppliers will thoroughly understand what is required. Adequate advertisement (30 days minimum) or direct contact is made with new and established manufacturers, small, minority and women's business enterprises to ensure each has an opportunity to compete. Date, time, and place of qualification information are given in advertisements and direct contacts.

Evaluation of the qualification submittals should be made by the A/E and reported to you. All proposers are notified of their status. Protests, if any, should be handled in accordance with the procurement regulations (Section 16.11).

Equipment and Process Compatibility

Recognizing the requirements for free and open competition, the resulting uncertainty of equipment selection and its incorporation into the treatment system, construction drawings and specifications should be reviewed to ensure equipment and process compatibility. In many cases shop drawings from successful suppliers will be insufficient to ensure compatibility of operation and control of an integrated total treatment system. It is, therefore, essential that the A/E thoroughly reviews unit process interfaces with respect to mainstream process performance characteristics and control and the impact of sidestream and overall system controllability.

Material and Storage of Equipment

To minimize potential adverse climatic effects, materials and equipment should be properly stored at the construction site. The specifications should include a provision directing contractors to obtain and implement storage procedures as recommended by the manufacturer.

Reliability

Treatment facilities should be designed, constructed and operated to ensure reliable total system performance over the life of the project as necessary to:

o Protect public health;

o Achieve water quality and pollution control objectives for both surface and groundwater;

o Prevent environmental damage.

Design practices necessary to ensure reliable performance, however, should be both cost effective and cost beneficial.

Reliability can be designed into a project by one of two methods: (1) a separate analysis of risks, costs and benefits or (2) the use of generally recognized criteria such as State standards or the suggested design features described in this chapter. Your A/E generally will select the most appropriate method.

In the first method, determination of the level of reliability required to satisfy these conditions should consider:

- Total cost including capital cost, O&M costs and the cost of failure (if this can be costed) times the probability of failure;
- Size and relative contribution of excessive wastewater pollutant loadings compared to uncontrolled sources (e.g., nonpoint source pollutant loadings);
- Magnitude, duration and frequency of excessive pollutant loadings in comparison to receiving water quality and assimilative capacity;
- Conservative versus nonconservative nature of pollutant;
- Stability or persistence of pollutant in the receiving waters.

These factors identify and quantify the consequences of failure as the basis for design levels of total system reliability.

In the second method, techniques are employed to designate surface or groundwaters by their use and to select a corresponding treatment level and class of reliability for the treatment facilities. Treatment levels are defined in "Alternative Waste Management Techniques for Best Practicable Waste Treatment" with the greatest level of treatment given to surface waters used for public drinking water supply, water contact recreation, shellfish, and fisheries.

The reliability class for treatment facilities is designated based on the use of the receiving waters and the probable adverse impact of inadequately treated discharge on them. Reliability classes may be:

- Class I - treatment works which discharge into navigable waters that could be permanently or unacceptably damaged by effluent which is degraded in quality for only a few hours (e.g., discharges near drinking water sources into shellfish waters or in close proximity to areas used for contact sports);
- Class II - treatment works which discharge into navigable waters that would not be permanently or unacceptably damaged by short-term effluent quality degradation but could be damaged by continued (several days) effluent quality degradation (e.g., discharges into recreational waters);
- Class III - treatment works not otherwise designated as Class I or II.

Each class is broadly defined for each of the three major systems within a treatment facility: (1) wastewater treatment system, (2) sludge handling and disposal system, and (3) electric power system. Each of the three major systems contains recommendations common to each class and component backup recommendations for each separate class. Tables 1, 2, and 3 summarize the recommendations for each reliability class.

TABLE 1 - WASTEWATER TREATMENT SYSTEM RELIABILITY

WASTEWATER TREATMENT SYSTEM

Features Common to Class I, II, III:

Trash removal or comminution

Grit removal - not applicable to treatment works which do not pump or dewater sludge (e.g., stabilization ponds)

Provisions for removal of settled solids - applicable to channels, pump wells and piping prior to degritting or primary sedimentation

Holding basin - applicable to Class I with adequate capacity for all flows

Unit operation bypass - not applicable where two or more units are provided and operating unit can handle peak flow; applicable to comminution regardless of number of units

Component Backup Features	Class I	Class II	Class III
Backup bar screen for mechanically cleaned bar screen or comminutor	Yes	Yes	Yes
Backup pump	Yes^1	Yes^1	Yes^1
Primary sedimentation basins	Multiple basins^2	Multiple basins^2	Minimum 2^2
Trickling filters	Multiple filters^3	Multiple filters^2	No backup
Aeration basin	Min. 2 of equal volume	Min. 2 of equal volume	Single basin permissible
Aeration blowers or mechanical aerators	Multiple units^4	Multiple units^4	Minimum 2^4
Air diffusers	Multiple sections^5	Multiple sections^5	Multiple sections^5
Final sedimentation basins	Multiple basins^3	Multiple basins^2	Minimum 2^2
Chemical flash mixer	Min. 2 or backup^6	No backup	No backup
Chemical sedimentation basins	Multiple basins^3	No backup	No backup
Filters and activated carbon columns	Multiple units^3	No backup	No backup
Flocculation basins	Minimum 2	No backup	No backup
Disinfectant contact basins	Multiple basins^2	Multiple basins^2	Multiple basins^2

1 - Sufficient capacity of remaining pump to handle peak flow with one pump out of service
2 - With largest unit out of service remaining units have capacity for at least 50% design flow
3 - With largest unit out of service remaining units have capacity for at least 75% design flow
4 - With largest unit out of service remaining units able to maintain design oxygen transfer; backup unit may be uninstalled
5 - With largest section out of service oxygen transfer capability not measurable impaired
6 - If only one basin, backup system provided with at least 2 mixing devices (1 may be uninstalled)

TABLE 2 - SLUDGE HANDLING AND DISPOSAL SYSTEM RELIABILITY

SLUDGE HANDLING AND DISPOSAL SYSTEM
Features Common to Class I, II, III: Alternate methods of sludge disposal and/or treatment - applicable to unit operations without backup capability Provisions for preventing contamination of treated wastewater
Component Backup Features Common to Class I, II, III: Sludge holding tanks - permissible as alternative to backup capability with adequate capacity for estimated time of repair Backup pump - sufficient capacity of remaining pumps to handle peak flow with 1 pump out of service; backup pump may be uninstalled Anaerobic sludge digester Digestion tanks - at least 2 digestion tanks Sludge mixing equipment - backup equipment or flexibility of system such that with 1 piece of equipment out of service total mixing capability is not lost; backup equipment may be uninstalled Aerobic sludge digestion Aeration basin - backup not required Aeration blowers or mechanical aerators - at least 2 units; permissible for less than design oxygen transfer with 1 unit out of service; backup unit may be uninstalled Air diffusers - with largest section out of service oxygen transfer capability not measurably impaired Vacuum filter - multiple filters with capacity to dewater design sludge flow with largest capacity filter out of service; each filter serviced by 2 vacuum pumps and 2 filtrate pumps Centrifuges - multiple centrifuges with capacity to dewater design sludge flow with largest capacity centrifuge out of service Incinerators - backup not required; backup required for critical auxiliary components (e.g., center shaft cooling fan)

TABLE 3 - ELECTRIC POWER SYSTEM RELIABILITY

<table>
<tr><th colspan="4">ELECTRIC POWER SYSTEM</th></tr>
<tr><td colspan="4">Features Common to Class I, II, III:
Power sources - two separate and independent electric power sources from either two separate utility substations or one substation and one standby generator</td></tr>
<tr><td>Capacity of Backup Power Source</td><td>Class I</td><td>Class II[1]</td><td>Class III[1]</td></tr>
<tr><td>Mechanical bar screen or comminutors</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Main pumps</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Degritting</td><td>Optional</td><td>No</td><td>No</td></tr>
<tr><td>Primary sedimentation</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Secondary treatment</td><td>Yes</td><td>Optional</td><td>No</td></tr>
<tr><td>Final sedimentation</td><td>Yes</td><td>Optional</td><td>No</td></tr>
<tr><td>Advanced waste treatment</td><td>Optional</td><td>Optional</td><td>No</td></tr>
<tr><td>Disinfection</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Sludge handling and treatment</td><td>Optional</td><td>No</td><td>No</td></tr>
<tr><td>Critical lighting and ventilation</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
</table>

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[1] At least treatment equivalent to sedimentation and disinfection

11.0.14 LAND BASED SYSTEMS

The design of land based systems should be based on:

- o "Process Design Manual, Land Treatment of Municipal Wastewater" (EPA 625/1-81-013);
- o "Design Manual, Onsite Wastewater Treatment and Disposal Systems" (EPA 625/1-80-012);
- o "Process Design Manual for Sludge Treatment and Disposal" (EPA 625/1-79-011).

The specifications should also address protection of soil integrity during construction. For example, onsite system trench construction for the soil absorption system should not take place during wet weather where clays are present, equipment travel should avoid infiltrative surfaces and special attention should be given to grade, bedding and backfill materials. For land treatment systems, the land surface should be disturbed as little as possible or restoration techniques (plowing, discing) should be employed wherever necessary. Limitations on the size and weight of the construction equipment and climatic conditions during which construction may not take place should be included in the specifications especially for land based systems.

11.0.15 EROSION AND SEDIMENT CONTROL

During the environmental evaluation of your project in the facilities planning stage, the potential for soil erosion and sediment buildup in water bodies, wetlands or floodplains was considered. In all likelihood, the environmental information document recommended the employment of certain mitigating procedures during design and construction of the project to provide erosion and sediment control. You should also ensure that erosion and sediment control measures addressed in your facilities plan are incorporated in the design and construction phases of your project. Such measures should include:

- o A schedule that provides for the construction of structures as soon as possible after clearing and grading;
- o Specifications for temporary and permanent measures to be used for controlling erosion and sediment;
- o A list containing completion dates for each temporary and permanent measure for controlling erosion and sediment; location, type and purpose for each measure; and dates when temporary measures will be removed or replaced;
- o Soil or landscaping maintenance procedures should be included in the O&M manual.

11.0.16 MITIGATION OF ADVERSE ENVIRONMENTAL IMPACTS

During project design, review the recommendations for mitigation of adverse environmental impacts contained in your facilities plan or in the reviewing agency's environmental assessment and incorporate appropriate mitigation measures into the project design. Failure to incorporate mitigation measures could lead to a requirement for EPA to prepare an EIS, thus potentially delaying the project.

11.0.17 SEWERS

Sewers should be designed to maintain minimum scouring velocities and have adequate capacity to accommodate flows based on appropriate peaking factors.

An allowable rate of infiltration for sewers should be specified and confirmed by tests after installation (Section 5.4).

11.0.18 SEWER REHABILITATION

Where sewer system rehabilitation is required based on the conclusions of the sewer system evaluation, specifications and bid proposals should include unit prices for such items as: internal closed-circuit television monitoring, sewer line cleaning, pressure testing, and chemical grouting of joints, slip lining, or any other item of work that lends itself to unit pricing. In addition, the specifications should define the sequence of operations (cleaning, TV, pressure test, grouting) and the approval authority necessary to perform each operation.

11.0.19 OPERATION AND MAINTENANCE

The proposed design should provide for flexibility in operation (e.g., bypassing of individual unit processes or components) and easy access to equipment requiring routine maintenance (e.g., greasing of bearings or changing of lubricants).

11.1 ADMINISTRATIVE CONSIDERATIONS

Chapter 16 addresses procurement. It describes procedures which allow you to use your own procurement system or in the alternative the minimum requirements to be followed when using EPA's procurement system. The sections below discuss administrative provisions of the procurement regulations applicable to construction and which are included in the bidding documents as they are developed. Bidding documents are prepared by your A/E and include:

- o A complete statement of work to be performed, including where appropriate, construction drawings and specifications and the required performance schedule;
- o The terms and conditions of the subagreement to be awarded, including where appropriate, payment, delivery schedules, point of delivery and acceptance criteria;
- o A clear explanation and the method of bidding and the method of evaluating bid prices, and the basis and method for awarding the subagreement;
- o The responsibility requirements or criteria which will be employed in evaluating bidders;
- o The prevailing wage determination made under the Davis-Bacon Act, if applicable; and
- o The deadline and place to submit bids and a copy of 40 CFR 33.295 and subparts F and G to 40 CFR Part 33.

By including in the specifications copies of the regulations cited in the preceding item or their equivalent (Section 16.10), many of the administrative statutory requirements are initially satisfied. At a later time these requirements may have to be invoked in order to assure compliance with their provisions. In addition to the bidding documents and regulatory provisions above, other provisions of the procurement regulations applicable to construction of the project are briefly described below.

11.1.1 BONDING AND INSURANCE

Contracts under $100,000 are subject to State and local requirements for bid guarantees, performance and payment bonds. For contracts in excess of $100,000 you may (a) use your own requirements for these items provided the reviewing agency determines that the Government's interest is adequately protected or (b) require a 5 percent bid guarantee and 100 percent performance and payment bonds. Bonds shall be obtained from companies holding certificates of authority as acceptable sureties.

Contractors should be required to obtain construction insurance (e.g, fire and extended coverage, workmen's compensation, public liability and property damage, and "all risk", builder's risk, or installation floater coverage) as required by State or local law.

Flood Insurance

Flood hazard areas have been delineated on Flood Hazard Boundary Maps or Flood Insurance Rate Maps issued by the Department of Urban Development. If flood hazard areas in your community are delineated in one of these maps, your participation in the Federal Emergency Management Agency's flood insurance program is a prerequisite for Step 3 grant assistance. You will have to provide adequate flood protection insurance for structures located in flood hazard areas both during construction (specifications generally require the contractor to provide this insurance during construction) and for the useful life of the project. Insurance is necessary on new or reconstructed surface structures which are walled or roofed (e.g., control building or pumping station) and have a value of $10,000 or more.

11.1.2

(Reserve)

11.1.3

BUY AMERICAN The CWA requires that preference be given to domestic construction materials in EPA grant assisted projects. The preference is limited to 6 percent above the bid or offered price on foreign materials (including duties whether or not assessed). Some construction materials manufactured in the United States include both domestic and foreign components. If the construction material has foreign components representing 50 percent or more of the value of the product, the entire product is considered to be foreign.

The Buy American clause in the procurement regulations is to be included in all EPA grant assisted projects. The reviewing agency may waive this requirement where appropriate.

11.1.4
ROYALTIES

Reasonable royalties associated with the procurement of the right to use or the rights in a patented product, apparatus, or process are allowable costs for grant participation provided that they are necessary, cost effective and that prior written approval is obtained from the reviewing agency. Periodic payment of royalties for the right to operate under a patent are considered operating costs and are not allowable for grant participation. Prior to specifying a product or process which requires the payment of a royalty, you should determine if other royalty-free products or processes are available in order to provide competitive bidding. Royalties are based on a published fee schedule or on reasonable fees charged to other users under similar conditions.

11.1.5
PROJECT SIGN

A sign for the project site should be provided by the contractor in accordance with established specifications (Appendix J).

11.1.6
SMALL, MINORITY, WOMEN'S AND LABOR SURPLUS AREA BUSINESSES

Contractors should take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction and services in accordance with 40 CFR Part 33. The affirmative steps are described in Section 16.9 and are to be included in the bidding documents.

11.2
DESIGN REVIEW

A review of your bidding documents including the construction drawings and specifications will be performed prior to Step 3 grant assistance or before initiating procurement action on Step 2+3 projects. A technical review of the construction drawings and specifications will be made by your reviewing agency. Also, a biddability and constructability review will be conducted by the COE or delegated State to ascertain that the proposed construction drawings and specifications provide adequate information so that a contractor can bid and construct the facility without additional details or directions. The review does not relieve you nor your A/E of responsibility for the project design, but it is a reasonable determination that the effluent or water quality limitations in the facilities plan are likely to be achieved, that the results of the sewer system evaluation have been considered, that the recommendations of the VE review have been included and that the procurement regulations are satisfied. Structural, electrical and mechanical details of design will typically not be reviewed in detail. Obvious irregularities will be noted and reported to you. Compliance with design and administrative considerations of this section will be confirmed by your reviewing agency.

CHAPTER 12

CONCURRENT ACTIVITIES DURING DESIGN

12.0 CONCURRENT ACTIVITIES

During project design it will be necessary to undertake other activities which are either directly or indirectly related to the project design or are a part of the grant application process. While some of these activities could be undertaken after design, it is recommended that they be performed concurrently with design in order to save time and continue moving the project toward grant award.

12.1 VALUE ENGINEERING (VE)

VE is an intensive review utilizing a specialized cost control technique which identifies unnecessary high cost in a project. VE obtains the best project at the least cost without sacrificing quality or reliability by incorporating:

o A multidisciplinary team of design professionals guided by a VE coordinator;

o An evaluation of cost and function relationships;

o Concentration on high cost areas;

o Generation of creative alternatives;

o Cost savings without sacrifice to quality or reliability;

o Recommendations to you and the original design team.

A VE review is required for treatment works costing in excess of $10 million. VE is recommended for projects costing less than $10 million because of the potential for substantial savings. VE serves as a mechanism to enhance the design of wastewater treatment facilities by providing the project designer with an opportunity to utilize the knowledge and experience of other individuals to optimize the project design.

12.1.1 VE TEAM AND QUALIFICATIONS

The VE team coordinator is an important VE participant who should have demonstrated technical and managerial capability enhanced by a 40-hour VE workshop. The team coordinator acts as a liaison between the VE team, the project's design team, the review agencies and you. The team coordinator should have participated in at least two VE studies on wastewater construction projects.

Other VE team members should be experienced professionals with VE training and, if possible had previous VE experience in wastewater construction projects. For a treatment plant project the team members may include a sanitary engineer, an electrical engineer, a mechanical engineer, a civil/structural engineer, a plant operator, and a cost estimator. The team makeup and size should be in proportion to the nature, size, and complexity of the project.

Because it is essential that the VE team be independent and objective, you may want to consider using a separate subagreement with a second A/E firm to perform the VE review instead of a subcontract or under the original A/E subagreement.

12.1.2
SCOPE OF WORK

The VE review should consider all components and systems of the project. Depending on the size and complexity of the project, the VE effort may vary from one team and one review session to multiple teams and multiple reviews. For example, on a large treatment plant project with advanced waste treatment, two separate reviews may be appropriate: one review at the 20-30 percent design stage to evaluate the treatment process, design life, plant layout, structural design, hydraulic capacity, etc.; and a second review when electrical and mechanical systems are being designed.

The VE review will generally result in two reports. The preliminary report should include such items as:

o Scope of the VE review;

o Basic VE methodology employed including the results of each phase such as:

> Information Phase - collection of all facts, background and data that are pertinent to the design, including a functional analysis and a cost model;
>
> Speculative or Creative Phase - creation of an extensive list of alternative ways to perform the essential functions found during information gathering, concentrating on areas with highest potential savings;
>
> Evaluation and Analytical Phase - evaluation of the feasibility of alternatives generated during the creative phase;
>
> Investigation Phase - a more complete evaluation of the most feasible alternatives;

o Summary of VE recommendations;

o Estimated cost savings for each recommended alternative.

The preliminary report is often presented both orally and in writing to you and the original design team. Since the objective is to obtain the best project at the least cost without sacrificing quality or reliability, it is important that all participants in the VE process remain objective.

A final report should include items such as:

o Accepted VE recommendations;

o Cost and schedule for implementing the accepted recommendations;

o Rejected recommendations and reasons for the rejection;

o Net savings (both capital and O&M) over the planning period.

In reviewing the final report you and your reviewing agency should ensure that rejected recommendations are well justified or request a reevaluation.

12.1.3
PROPOSAL COST AND TIMING

Since VE is a process that involves numerous senior professionals, the selection of experienced and well qualified VE team members and the team coordinator is essential for best results. Likewise, it is vital that you and your design A/E, when soliciting or advertising for VE proposals, clearly specify VE coverage, constraints, number of studies required and other essential factors to assure that all proposals will be submitted on the same basis. Proposals should specify:

the number of studies and teams, names and experience backgrounds for team leader and study team members including disciplines represented, description of tasks and procedures with schedules and cost for the study and report.

Experience shows that two VE studies (one at about 25 percent, the other at about 75 percent of design) will generally achieve optimum VE benefits. If project constraints rule out the second study, one study should be scheduled usually around 30 percent of design for best results. If managed properly, VE will not delay the project. After the team selection, a prestudy meeting with you, your design A/E, VE team leader and reviewing agency will help refine the scope, schedules and procedures and improve working relationships to maximize study benefits.

12.2
USER CHARGE SYSTEM

The user charge represents the amount of money you will charge each customer each year in order to pay for the operation, maintenance, and replacement (OM&R) of the wastewater collection and treatment system. A sound user charge system is an essential step in ensuring your ability to pay for OM&R. Generally, the charges are based on the amount of water (measured by water meters) used by homeowners and small commercial establishments. Industries and large commercial users, in general, also pay by water use but in addition a surcharge may be added because the strength of their waste or the rate of discharge causes additional O&M costs to be incurred. Nonresidential users which discharge toxic pollutants into the system will pay for any increased costs of managing the effluent or sludge that results from the toxics. The objective of the user charge system is to provide the money necessary to operate and maintain the treatment works plus a reserve to pay for replacement. Replacement is the expenditures for obtaining and installing equipment, accessories or appurtenances during the useful life of the treatment works necessary to maintain its design capacity and performance (e.g., pumps, motors, etc.). The O&M costs will include items such as salaries, chemicals, utilities, insurance, training, supplies, etc.

The user charge system as used in this context should not include charges which are levied to customers to retire bonds or amortize debt. The EPA regulations do not contain requirements for how you accomplish this. You may include a separate charge for capital expenses or debt service on bills to users or in the general tax base.

In public meetings during facilities planning, you should have advised the public of the estimated user charges. If the user charges developed during design are significantly different, you should consider having another public meeting to explain the difference. An EPA publication on user charge systems will be of assistance to you in developing and implementing your user charge system. However, the next few sections briefly describe some aspects of user charge systems.

12.2.1
ACTUAL USE

One basis for a user charge system is the contributor's actual use of the wastewater treatment works. The actual use is measured in terms of water meter readings, measurement of sewage flow, strength or rate of discharge from large nonresidential users or other means of determining the proportion of the system used by contributors. The rate charges based on actual use are then uniformly applied in each class of users (residential, small commerical, etc.) in proportion to its contribution. Note, however, that the rates may vary between classes and in some water-short areas rates have been established to help conserve water resources and encourage recycling or reuse of process wastes.

If you do not have an existing user charge system and are building a new system, the user charge for the first year should be based on your estimates of O&M costs and then adjusted annually thereafter to reflect actual costs.

12.2.2
AD VALOREM TAXES

Another approach used for developing a user charge system is based on ad valorem taxes. Ad valorem taxes are taxes based on the value of property. This system has been approved for use because some municipalities have based their tax system on it. In order for an ad valorem based user charge system to be approved, certain conditions are to be satisifed.

- As of December 27, 1977 you had in existence a system of dedicated ad valorem taxes which was used then and continues to be used for collecting revenues for the operation and maintenance of your treatment works.
- The ad valorem user charge system distributes costs to the residential and small nonresidential users class, in proportion to the use of the treatment works by this class.
- Industrial and commercial users as a class each pay their share of the O&M costs (including replacement) based on actual use.

12.2.3
OTHER USER CHARGE CONSIDERATIONS

It is necessary that each user be notified at least annually of the rate and portion of the user charges or ad valorem taxes attributable to OM&R of the treatment works. For example, assume 3 persons per household with each person using 70 gallons per day. This is equivalent to 76,650 gallons per year for the household. If we further assume that the annual user charge is $100 per year and of this amount $40 is for operation and maintenance and $60 is for debt retirement, the user charge rate would be $.52 per 1,000 gallons ($40/76.65 x 1,000 gallons). The user is specifically notified of this rate ($.52/1,000 gallons) although in some cases the bill may include other charges.

A problem sometimes arises for those communities with existing sewer systems which contain some infiltration and/or inflow which is not economical to remove. The O&M costs for treating this flow can be distributed among all users based on either:

- The same manner that is used for actual use, or
- Any combination of flow volume, land area of user, number of hookups or discharges, or property valuation (if an ad valorem system has been approved).

12.2.4
ADOPTION OF SYSTEM

The user charge system is generally developed during the design phase and approved as a prerequisite to award of grant assistance. Very often the user charge system is enacted by a municipal ordinance and includes details on how rates will be established, how often bills will be sent, and requires annual review and updating as necessary. The annual review should be conducted to determine whether sufficient revenue is being collected, whether revenue is generated in proportion to cost, and that the equipment replacement reserve account is adequate. If your project will serve more than one municipality, it will be necessary for each participating jurisdiction to enact similar or identical user charge systems before the treatment works is placed in operation. Where there are prior service agreements concerning user charges, the new system developed and approved under the EPA grant will take precedence over any terms or conditions of earlier, inconsistent agreements. Enact the user charge system before the treatment works are placed in operation.

12.3

SEWER USE ORDINANCE

Approval of a sewer use ordinance is a prerequisite to award of grant assistance. A sewer use ordinance restricts certain connections and wastes, in order to protect your investment and enhance treatment process stability and effluent quality. Many municipalities with existing wastewater treatment systems have already enacted a sewer use ordinance. In this case you should submit a copy with your grant application to your project reviewer.

The sewer use ordinance:

o Prohibits new inflow sources, i.e., extraneous water generally associated with storm events such as downspouts, area drains, sump pumps, connections from storm sewers, etc.;

o Requires that new sewers and connections be properly designed and constructed;

o Prohibits introduction of wastes into the sewers in an amount or concentration that endangers the public's safety or the physical integrity of the system which may cause violations of your NPDES permit or preclude the selection of the most cost-effective alternative for treatment, reuse and sludge disposal.

The sewer use ordinance should be directly related to your municipal pretreatment program and may be the legally binding instrument which implements portions of your pretreatment program.

While the three items above form the basis for a sewer use ordinance, the actual details contained in the ordinance may be much more specific and contain descriptions or procedures such as: limitations on wastewater strength from nonresidential users; prohibition on dilution; notification procedures concerning accidental spills; discharge reporting requirements; rights of all parties including right of municipality to enter all properties for testing and measurement and right of property owners including protection of trade secrets, insurance, and safety requirements.

As is true with the user charge system, if your project serves more than one municipality, it may be necessary for each jurisdiction to enact a sewer use ordinance in order to ensure that the entire system is protected.

12.4 PLAN OF OPERATION

A draft plan of operation prepared during project design can be an effective management tool for planning and scheduling those activities necessary during construction, startup and continuing operation. The submittal of a draft plan of operation is a prerequisite for Step 3 grant award. The draft plan of operation schedule should identify specific actions and completion dates to assure an orderly transition from construction to operation and forms the basis for a final plan of operation. Grant payments will not exceed 50 percent until a satisfactory plan of operation is submitted to your reviewing agency. Some of the more important considerations to be addressed in a plan of operation are summarized in the next sections.

12.4.1 STAFFING AND TRAINING

o A staffing plan should include salaries, number of staff, organizational structure and licenses or certifications for operators;

o Chief operator should be hired before construction is 50 percent complete;

o Preoperation training should be begun 30 days after chief operator is hired;

o Hiring problems, if any, should be identified 60 days before plant startup;

o All staffing problems should be resolved and hiring accomplished 30 days before startup;

o Continuous training plan and schedule should be developed 30 days prior to plant startup.

12.4.2 ADMINISTRATIVE FUNCTIONS

o Laboratory and testing procedures should be established in order to monitor treatment process including;

o Procedures for submission to State of required reports;

o Procedures for startup and continuing engineering services for one year after completion of construction;

o Provisions for employee safety training prior to plant startup;

o Provisions for a maintenance management system.

o Procedures for financial management system to include accounting, billing, collection, and annual review.

12.4.3 BUDGET

o An adequate budget identifying the basics for determining the annual O&M costs and cost of personnel, material, administration, supplies, utilities, chemicals, equipment replacement, contractual services, insurance, etc.;

o Salaries including benefits which will attract qualified personnel;

o Training to orient and upgrade employees.

12.4.4 OPERATION AND MAINTENANCE (O&M) MANUAL

An O&M manual is an essential part of the plan of operation. It provides essential information for the treatment works operator and guidance for day-to-day operations. Grant payments will not exceed 90 percent until a satisfactory O&M manual has been furnished to the reviewing agency. Major topics which should be included in the manual are:

o Information on items such as design and peak flows, pump capacities, sedimentation basin detention times, surface and weir loadings, food to microorganism loadings, oxygen transfer requirements, and other process design assumptions;

o Startup procedures for each unit operation and equipment items;

o Unit process information and control measures and monitoring procedures for efficient operation;

o Maintenance management system including procedures such as lubrication, oil and filter changes, and other preventive and routine maintenance procedures as well as a spare parts inventory;

o Laboratory tests necessary for control of the treatment works and the specific reports to be sent to regulatory agencies;

o Safety procedures for operating equipment with particular emphasis on potentially hazardous areas such as wet and dry wells, chlorination facilities and anaerobic digestors;

o Organizational structure, job descriptions and duties, purchase order preparation and approvals, budget preparation, etc;

o Troubleshooting, analyzing and solving problems which frequently occur in treatment plants and are related either to unit processes or the operation of specific pieces of equipment;

o Emergency operating plan including emergencies which may occur (for example, power outage, chlorine leak, excessive flows during storms) and the procedures to be followed until normal operation can be resumed.

12.5
ONSITE AND CLUSTER SYSTEMS

If your project includes onsite or cluster treatment systems, you will be responsible to:

o Assume responsibility for the systems including proper installation, operation and maintenance;

o Assure that systems will be constructed, operated and maintained to protect underground potable water sources;

o Develop a user charge system;

o Obtain reasonable access to all systems;

o Establish a comprehensive management and periodic inspection program including water well testing.

During the design phase you should prepare a brief report addressing these responsibilities and indicating how and when they will be implemented.

12.6
INNOVATIVE AND ALTERNATIVE (I&A) TECHNOLOGY RECONFIRMATION

During the development of your facilities plan you evaluated numerous alternative wastewater treatment systems including those employing innovative or alternative (I or A) technologies. The project, or its components, selected in your facilities plan may have been initially classified as I or A (Section 6.4.1). Based on the criterion or definition used to classify your project as I or A, it may be necessary to reconfirm that designation during design. For example, a project classified as alternative technology such as self-sustaining incineration may need to be reverified during design.

Proposed innovative technology projects, in general, require a more detailed evaluation than alternative technology projects in order to confirm the significant cost savings. It may be necessary to recompute the cost savings after a significant portion of the design is completed and compare it with the estimates in the facilities plan. On the other hand, the reviewing agency may determine that a treatment system is innovative because of local variations in geographic or climatic conditions or because it achieves significant public benefits which would not otherwise be possible. Based on the results of reevaluation the project or component parts may be confirmed as I or A or lose that designation. In the latter case, you should resolve with your project reviewer whether to continue with the project design presently underway.

12.7
PLANNING FOR LOCAL FUNDS

One criterion for evaluating and selecting your project during the facilities planning phase was a financial impact analysis (Section 7.2). At the conclusion of design you should reevaluate the financial impact of the project upon your municipality's financial status to ensure that the project is not too costly. For example, your A/E will have prepared a revised cost estimate of the project based upon the detailed construction drawings and specifications and current costs of construction. These costs should be compared with the estimates in your facilities plan. You should also reexamine your municipality's indebtedness or ability to finance the local cost share. During the time from completion of your facilities plan to completion of design, your municipality may have incurred other debts or undergone other changes which affect your debt limitation. If you determine that your project is not too costly, you should undertake financial arrangements to ensure that you can obtain the non-Federal funds for construction generally within 90 days of grant award. If you determine that your project is too expensive based on the criteria in Section 7.2, you should meet with your project reviewer to determine means of reducing project costs.

PART III. CONSTRUCTION

CHAPTER 13

GRANT APPLICATION

13.0 NARRATIVE STATEMENT

Your Step 3 grant assistance application will include your completed facilities plan, bidding documents including construction drawings and specifications as well as other supporting or supplementary information. After grant award your Step 3 activities will not only include building the project but also may include other activities such as preparation of the final plan of operation, implementation of your user charge system, etc. Therefore, you may find it helpful to prepare a narrative statement which describes your project's history (e.g., pertinent correspondence with your reviewing agency concerning your facilities plan, environmental review or design) and the activities you intend to undertake after grant award. The narrative statement serves to tie together all the separate activities (schedule, scope of work, costs), places them in proper perspective and helps attain complete understanding of your project by the project reviewer. If you choose to provide a narrative statement, it could be part of your letter forwarding the application package or a separate attachment.

13.1 CONTENTS OF APPLICATION

An application for Step 3 grant assistance includes:

o A facilities plan prepared in accordance with the regulations (Part I of this book);

o Certification that there has been adequate public participation based on State and local statutes.

o Comments of appropriate clearinghouse(s) (Section 131.1);

o Evidence of compliance with all applicable limitations on award (Section 13.2);

o Construction drawings and specifications suitable for bidding purposes and the project schedule (Part II of this book);

o Draft plan of operation;

o In the case of an application for Step 3 assistance that includes the acquisition of eligible land, include a plat which shows the legal description of the property to be acquired, a preliminary layout of the distribution and drainage systems, and an explanation of the intended method of acquiring the property;

o In the case of an application for Step 2+3 grant assistance, include the above items except drawings and specifications and eligible land description. Note that not all of the limitations on award are applicable at the time of Step 2+3 application.

The following sections discuss the contents of an application (other than facilities plans and project design) and in the case of limitations on award, list the items and provide references to other sections of this book.

13.1.1 CLEARINGHOUSE COMMENTS

Before submitting an application obtain the comments of the appropriate clearinghouse. If you elected to obtain clearinghouse comments after completion of your facilities plan but before design and if your project design conforms with the selected plan in your facilities plan, generally you need not obtain additional comments. If more than one year has elapsed between the date of clearinghouse comments and the date of application submission, it may be necessary (consult your project reviewer) to resubmit project information to the clearinghouse.

The clearinghouses have 30 days to review your application documents and return comments to you. Include the comments with your application and, if appropriate, address adverse comments.

13.1.2

APPLICATION FORM The application form (EPA Form 5700-32) contains specific instructions for its completion. The form is signed by your authorized representative acting as the "applicant" for grant assistance. Include a copy of the resolution designating the official authorized to sign the application. Three items, however, require special attention.

Site Information

For projects requesting grant assistance for acquisition of eligible land a plat which shows a legal description is required (Section 13.1). For projects requesting grant assistance for eligible land previously acquired or for which an option for purchase has been taken and for which approval as a preaward cost (Section 13.2) has been granted, submit a copy of the deed or other interest in the property or a copy of the option. In both cases, the deed will include provisions which note and protect the Federal interests.

For projects involving land acquisition not eligible for grant assistance, the land, easements or other real property must be obtained, bonafide options taken or formal condemnation proceedings initiated before grant assistance is awarded. The municipal attorney will need to describe the status of your real property acquisitions in a separate attachment to your application.

Funding Local Share

The application form requires information concerning the amount of grant assistance (Federal and/or State) you expect to receive. You should explain fully how you will raise the non-Federal project funds in order to initiate procurement actions to build the project promptly. If procurement action for building the project is not initiated within nine months from grant award, your grant may be terminated.

Assurances

Review the assurances contained in Part V of the grant application form carefully. After grant award you will have to anticipate and plan for the work involved in meeting these assurances.

13.2

LIMITATIONS ON AWARD Before grant award the project reviewer will determine that all regulatory requirements are met and that costs requested for grant participation are reasonable and allowable. Many of these limitations will have been satisfied if your facilities plan and design have been completed in accordance with this guidance. However, the limitations are listed below as a convenient check to you and referenced to other sections of this book or are briefly described as appropriate.

Advanced Treatment

Projects for which the incremental cost of advanced treatment exceeds $3 million are to be reviewed and approved by EPA headquarters (Section 9.2.2).

Water Quality Management (WQM) Plans

Projects will be consistent with applicable WQM plans and grant applicants shall be as designated in the plan (Section 4.1).

Priority Determination

Projects will be listed on the State's project priority list and the award of grant assistance shall not jeopardize the funding of any projects of higher priority.

Funding and Other Considerations

Grant applicants will agree to pay the non-Federal project costs and demonstrate the legal, institutional, managerial and financial capability to ensure adequate building and OM&R of the treatment works (Section 2.1). Certify that it has not violated any Federal, State, or local law in connection with facilities planning or design work.

Debarment and Suspension

Grant applications will indicate whether a subagreement was awarded to an individual, organization or unit of government for facilities planning or design work whose name appears on EPA's master list of debarments, suspensions and voluntary exclusions. If grant applicants affirmatively certify that such an award was made, EPA will closely examine the facilities plan, construction drawings and specifications to determine whether to award a Step 3 grant.

Intermunicipal Service Agreements

Executed intermunicipal service agreements or other legally binding instruments covering financing, construction and operation will be submitted for Step 3 projects or before initiating procurement action on Step 2+3 projects if the project serves two or more municipalities (Introduction-Managing Your Project). This requirement may be waived if:

o An agreement is already in place;

o Historical evidence for services between parties exists; or

o The grant applicant is financially strong enough to continue the project even if one of the proposed communities fails to participate.

Segmented Treatment Works

Grant assistance may be awarded for a phase or segment of a treatment works, although the phase or segment does not result in compliance with the enforceable requirements of the CWA, provided:

o Grant applicants agree to complete the treatment works of which the phase or segment is a part in accordance with a specified schedule in the grant agreement, regardless of whether or not grant funding is available for the remaining phases or segments; and o One or more of the following conditions exist: (1) the federal share of the cost of building the treatment works would require a disproportionate share of the State's annual allotment relative to other needs or would require a major portion of the State's annual allotment; (2) the period to complete the building of the treatment works will cover three years or more; (3) the treatment works must be phased or segmented to meet the requirements of a Federal or State court order.

Step 2+3

Grant assistance for Step 2+3 projects are limited to: municipalities with population of 25,000 or less; allowable Step 3 project cost of $8 million or less; and complete treatment systems (i.e., not for treatment works phase or segment).

Access to Individual Systems

Grant applicants will provide assurance of unlimited access to privately owned individual systems and provide assurance of complete management capability for small alternative wastewater treatment systems (Section 6.4.3).

Revised Water Quality Standards

Grants may not be awarded after December 29, 1984 in States which have failed to review and revise if appropriate or adopt new water quality standards.

Marine Waiver Discharge Applicants

Grant applicants who have also applied for a secondary treatment waiver (Section 301(h) of the CWA) will include with their applications provisions for possible future additions of treatment processes to meet full secondary treatment requirements.

Environmental Review

Grant applicants will have completed an environmental information document (EID) as part of their facilities plan and worked with their reviewing agency in order for the reviewing agency to make a determination as to the appropriateness for categorical exclusion, a finding of no significant impact (FNSI) or the preparation of an environmental impact statement (EIS) (Section 9.2.2). An application for grant assistance will be submitted only after EPA has completed the appropriate environmental document in accordance with 40 CFR Part 6.

Value Engineering Review

Projects with total estimated costs of building the treatment works in excess of $10 million will be subject to a value engineering review prior to grant award (Section 12.1).

Sewage Collection Systems

Projects involving sewage collection systems will be for replacement or major rehabilitation of existing systems not built with Federal funds awarded after October 18, 1972 or for new systems where the bulk (generally two-thirds) of the expected flows are from residences in existence on October 18, 1972 (Section 6.3). Grant applicants will provide assurance that existing residences will connect to the sewer system within a reasonable time after project completion.

Preaward Costs

In general, project work performed before grant award is not allowable for grant participation except: an allowance will be included in the grant award for facilities planning and design (Section 1.0); in emergencies where delay could result in significant cost increase (e.g., procurement of major equipment requiring long lead times, field testing of I&A technologies, minor sewer rehabilitation, acquisition or option for purchase of eligible land, advance building of minor portions of the treatment works); and only after completion of the environmental review and approval by the reviewing agency. Prior approval of preliminary Step 3 work by the reviewing agency does not obligate it to grant assistance, and potential grant applicants proceed at their own risk.

Infiltration/Inflow (I/I)

Grant applicants will demonstrate that the proposed treatment works project is not or will not be subject to excessive I/I (Section 5.4).

User Charge System and Sewer Use Ordinance

A user charge system (Section 12.2) and sewer use ordinance (Section 12.3) will be approved before grant award for Step 3 projects or before initiating procurement action for Step 2+3 projects. Where an existing system or ordinance is in effect, it will be demonstrated that they are adequate and being enforced.

Reserve Capacity

Grant assistance for reserve capacity will be limited depending on the date of Step 3 grant award and the date of earlier segmented grant awards if any (Section 7.1).

Transport and Treatment of Compatible Industrial Wastewater

Grant assistance will be provided for treatment works capacity to transport and treat compatible industrial wastewater only if the treatment works would be eligible for grant assistance in the absence of the industrial capacity. Grant assistance will not include (a) costs to convert noncompatible to compatible wastewater nor transport nor treat noncompatible wastewater, and (b) costs allowable to the transport and treatment of wastewater from a Federal Government facility with flows in excess of 250,000 gallons per day or 5 percent of the design flow whichever is less.

In addition to the regulatory limitations on award cited above, other actions or documentation may be required at the time of application based on the results of your facilities plan or project design. For example, you may need to furnish evidence of your participation in the flood insurance program (Section 11.1.1), you may need to describe your procedures to comply with your pretreatment program (Section 8.5.4), or you may wish to continue with your public participation program (Section 3.1). In any case, you should provide sufficient information and documentation to describe the activities you will undertake during Step 3.

Plan of Operation

Grant applicants will submit a draft plan of operation (Section 12.4).

13.3
OTHER STEP 3 CONSIDERATIONS

Several other Step 3 actions should be undertaken either prior to or after Step 3 grant assistance. These actions and their timing are briefly described below.

Grant Payment Schedule

Your application should include a preliminary or final schedule for disbursement of grant funds. The payment schedule may be revised after receipt of bids if necessary. For smaller projects the schedule may show quarterly payment requests but for larger projects monthly estimates may be advisable. In projecting a payment schedule you should anticipate payment of the allowance for planning and design with the first payment request after initiation of construction. This information is used to forecast your cash needs for Federal budgetary purposes. Give careful consideration to your cash flow needs and assumptions as the schedule is prepared.

13.4
PROCUREMENT

You are encouraged to use your own procurement system if it meets the Federal minimum requirements as described in Chapter 16. At the time of grant application complete the "Procurement System Certification Form for Applicants for EPA Assistance" (EPA Form 5700-48) in accordance with its instructions (Appendix N).

One aspect of procurement at the time of grant application concerns A/E services.

By signing the application form you have certified that you will comply with the assurances contained in Part V of the form. One of the assurances indicates that you will provide A/E services needed to complete the project, including technical supervision of the building of the project, to ensure conformance with approved construction drawings and specifications. In addition, a condition of grant acceptance will require that your prime engineer supervise the operation of the treatment works, train operating personnel, revise the O&M manual, prepare curriculum and training material for operating personnel, observe and periodically report on the performance of the project, and advise you whether the project is capable of meeting the project performance standards. These activities are to be carried out during the first year of operation of the project.

The procurement of the A/E firm to provide these services will comply with the applicable provisions of your certified procurement system or EPA's procurement regulations and the costs should be anticipated prior to and included in your application for assistance. However, under certain circumstances you may continue with the same A/E firm which provided engineering services during facilities planning or design without having to readvertise and reevaluate candidate firms (see Section 16._).

13.5
FEDERAL GRANT SHARE

After review and approval of a completed application, grant assistance will be awarded based on the sum of the total Step 3 allowable cost plus the allowance and will be:

o 75 percent before October 1, 1984;

o 55 percent after October 1, 1984; or

o 75 percent after September 30, 1984 for all segments of treatment works (except collection systems and CSO's) only if a related segment received Step 3 grant award prior to October 1, 1984;

o I&A technology projects or their I&A components may receive up to 85 percent grant assistance or 20 percent additional grant assistance whichever is less;

o A uniform lower Federal share may be requested by the Governor of a State and used on all projects and subsequent grant increases if any;

o In States which provide State grant assistance and for projects which are designated as I or A, the State grant will be in the same proportion as provided to non I or A projects. For example, assume a conventional project with a total cost of $100. The Federal share would be $75 and the non-Federal share the balance or $25. If a State is awarding 15 percent grants, the State grant would be $15 and the local share $10. The State grant represents 60 percent ($15/$25) of the non-Federal share. If an I or A project costing $100 is awarded an 85 percent Federal grant or $85, the non-Federal share is $15. In this case, the State grant is required to be 60 percent (as before) of the non-Federal share or $9 (60 percent x $15) and the local share is $6 (40 percent x $15);

o All grants are subject to Federal appropriations and the availability of remaining funds in the State's allotment or required reserves.

13.6 GRANT AWARD

State reviewing agencies will receive and review all applications and supporting documents to assure they are complete. In States which have been delegated authority to review and certify all requirements necessary for award of Step 2+3 and Step 3 grant assistance, the State will provide such certification to EPA and EPA will have 45 days in which to approve or disapprove the application. If EPA does not approve or disapprove the application within 45 days, the application will be deemed approved subject to available appropriations.

In States which have not entered into delegation agreements with EPA or have received partial delegation, the State will provide EPA with certification and other such documentation as has been agreed to between the State and EPA.

As a result of the review process, the project reviewer may modify the grant amount, scope of work or other aspects of the project. In addition, special conditions based on recommendations from the State agency may be included in the grant agreement (EPA Form 5700-20).

The completed grant agreement will be mailed to you. You should promptly review and accept the grant agreement and return it to EPA. The person signing and accepting the grant is the authorized representative (usually the same person who signed the application form). If there is a new authorized representative, an authorizing resolution will be included with the agreement. Once signed, the agreement forms a legally binding contract between you and the federal government. You should review the agreement carefully and, if necessary, discuss any changes from your application with your project reviewer. Also, note special grant conditions that require attention during your project and review the payment schedule included in the agreement.

CHAPTER 14

PROJECT CONSTRUCTION

14.0 PROJECT CONSTRUCTION

After grant award you are in a position to initiate procurement of construction contracts. Procurement is discussed in Chapter 16 and you should comply with guidance in that chapter concerning the use of your or EPA's procurement system.

14.1 GRANT INCREASES/ DECREASES

At the time you submitted your grant application you should have requested a grant based on your estimate of allowable project costs including building costs. Your building costs may also have included a "construction contingency" (typically 10 percent or less) since you cannot be sure of the costs until the project is bid. After receipt of bids your building costs are more firmly established and the contingency should be reduced (typically 2 to 5 percent). The post-bid contingency covers minor changes such as differences between estimated and actual quantities of material on unit price items or unknown field conditions which may be encountered.

14.1.1 GRANT INCREASE

If the bid prices of the successful contractors exceed your estimated building costs including the contingency and if the prices are reasonable and you wish to award the contract(s), you may apply for a grant increase. You should submit your request and supporting documents to your State agency. If appropriate and assuming sufficient funds remain available in your State allotment (most States maintain a reserve for grant increases), your grant should be amended by the State and EPA.

14.1.2 GRANT DECREASES

If your building costs are lower than estimated in your grant application, the State agency may initiate action to reduce your grant to the appropriate level. By doing so, the State may recover sufficient funds from your project and others allowing additional projects to be funded. A grant amendment agreement will be sent to you.

14.2 PRECONSTRUCTION CONFERENCE

It is recommended that after construction contract award you arrange a preconstruction conference. If deemed necessary a separate preconstruction conference may also be arranged by the Equal Employment Opportunity Office (EEO), U.S. Department of Labor (generally where building costs exceed $1 million) to insure that contractors comply with the equal employment opportunity provisions of applicable statutes and executive orders.

The preconstruction conference attendees should include you, your A/E, construction manager, project observer, all prime contractors, subcontractors, and representatives of your reviewing agency. The purpose of the preconstruction conference should to coordinate schedules, review and emphasize regulatory requirements, resolve questions, and set the groundrules for working together during construction.

If representatives of your reviewing agency are present, they will generally have a checklist of items they feel should be discussed at the conference. Listed below are some of the more common items.

o Responsibilities and authority of each party;

o Schedules for completion of project and coordination between contractors;

o Payment requests from contractors - form, timing, documentation, retainage;

o Change orders - requests, documentation, approval levels;

o Minimum wage - posting of wage rate determination;

o Compliance with local, State and Federal laws such as OSHA, EEO, minority, women's, and small businesses, etc.

The project reviewer may also want to meet separately with you to discuss other items not directly affecting the construction contractors. Discussions may include items such as:

o Adequate engineering supervision during construction;

o Reviewing agency onsite reviews;

o Management and processing of change orders;

o Processing of payment requests;

o Maintenance of adequate records for subsequent audit;

o Schedule for sewer system rehabilitation, if necessary;

o Enactment of sewer use ordinance and user charge system before the treatment works is placed in operation;

o Development, approval and implementation of the final plan of operation;

o Continuing A/E services during the first year of operation;

o Preparation and records for project closeout.

14.3 MONITORING CONSTRUCTION

Your grant application included an assurance that you will provide and maintain competent and adequate engineering supervision and observation of the project to ensure that the construction conforms with the approved construction drawings and specifications. The supervision and observation may be provided by municipal employees (force account Section 15.3), your A/E or a construction management firm. The observation services should provide technical assistance in the preparation and negotiation of change orders, processing of contractors' payment requests, preparation for regulatory agency onsite reviews and assure that the project is constructed in accordance with the approved construction drawings and specifications. The responsibility for monitoring construction activities and resolving problems rests with you.

14.3.1 CHANGE ORDERS

A change order is a written order by you to the construction contractor authorizing an addition, deletion or revision in the work or time of completion within the general scope of the contract. A change order is necessary to increase or decrease the contract work or cost, interrupt or terminate the project, revise the completion date, alter the design or to implement any other deviation from the original contract documents.

A change order normally originates as a proposal by the construction contractor or from your request for a change to the existing contract documents. A bilateral change, as distinct from a unilateral change, is more desirable since it minimizes disputes and claims at a later date.

Responsibilities

The successful completion of the change order management procedure depends on the successful execution of responsibilities by each participant. You should be responsible for financing and managing the project to completion and determining that a change is both necessary and reasonable in cost regardless of grant participation.

o Owner

You as the owner of the project should be responsible for:

o Ensuring that the construction contractor has a clear understanding of the scope and extent of the work;

o Assuring that the construction contractor has or will obtain the necessary personnel, equipment and materials to accomplish the work within the required time;

o Assuring a fair and reasonable price for the required work;

o Maintaining current and accurate fiscal projections of project and completion costs;

o Resolving disputes arising as a result of a proposed change;

o Notifying the reviewing agency of proposed changes which may require a grant amendment such as differing site conditions or change in the time of completion.

o Architect/Engineer (A/E) or Construction Manager

The A/E or construction manager represents you and normally acts as a technical advisor. The A/E or construction manager should perform the duties contained in his subagreement and is generally expected to:

o Act as a technical advisor during construction and on proposed changes;

o Provide expert opinion on whether a change is appropriate or not, and if so, why;

o Prepare an independent estimate of the proposed change to verify the estimate prepared by the construction contractor.

o Construction Contractor

The construction contractor should be responsible for preparing and submitting the proposed change order along with supporting documentation. In order to expedite the development of the change order, the construction contractor is expected to:

o Submit sufficient cost and pricing data to enable a determination of the necessity and reasonableness of cost and amounts proposed and the allowability of proposed costs;

o Certify that the proposed costs are complete, current and accurate when required;

o Maintain costing records for audit as required;

o Submit cost proposals in a timely manner and enter into meaningful negotiations on a necessary contract change;

o Comply with recordkeeping and accounting requirements for change orders costing in excess of $100,000.

Prior Approval

Prior approval of change orders is not required for changes to correct minor errors or to make minor or emergency changes. Other change orders require prior reviewing agency approval and grant amendment and include those which:

o Alter the project performance standards;

o Alter the type of treatment to be provided;

o Delay or accelerate the project schedule; or

o Substantially alter the facilities plan, construction drawings and specifications or the location, size, capacity or quality of any major part of the project.

Approval of a change order does not obligate the reviewing agency to an increase in grant amount beyond that which may have been provided in the construction contingency. Change orders are subject to the allowability determinations discussed in Section 15.0.

Contractor Claims

This section concerns the allowability for grant participation of contractor claims asserted against you and the allowability of costs incurred in defending against claims. Contractor claims should be resolved as equitably and expeditiously as possible in accordance with the facts of the situation, the provisions of the contract and sound business judgement.

Even though the reviewing agency is not a party to, and thus not bound by the settlement, arbitration award or court judgement, it will make an allowability determination, and thus it is important for you to know some of the criteria that will be used. Initially, the reviewing agency must be assured that the claim cannot be reasonably settled without arbitration or litigation. This means that claims or portions of claims that have merit should be negotiated and settled promptly, in accordance with the change order procedure which follows this section. Reasonable costs incurred to assess the authenticity of a claim related to the eligible portion of the project are allowable for grant participation, provided they are approved in advance by the reviewing agency. After agreement has been reached between you and the contractor on a claim and a change order has been submitted, the reviewing agency will evalute it for grant participation. All claims or portions of claims which are either the result of your mismangement, or for which you are liable, directly or vicariously, will be unallowable.

For claims which cannot be settled without arbitration or litigation, reasonable and necessary claim defense costs (e.g., legal, technical and administrative) incurred by you are allowable for grant participation to the extent that they are related to the grant eligible portion of the project and receive prior approval by the reviewing agency. The agency will be guided by evidence of your diligence and prudence in conducting negotiations in accordance with your certified procurement system or EPA's procurement regulations (40 CFR Part 33) and experience developed by the reviewing agency with similar claim defense costs.

Conditions Warranting a Change Order

A need for change orders generally arises from one of the six common categories of conditions discussed below. However, some change order requests may fall outside of these categories but have characteristics similar to them. Therefore, they can be related to the reasoning process developed in one or more of the six categories.

In contrast to the mutually recognized need for a change, certain acts or failure to act which increase the construction contractor's costs or time of performance may also be considered grounds for a change order. This is termed a constructive change and is claimed by the construction contractor within a reasonable time in order to be considered. Evaluate constructive changes using the reasoning process discussed below.

o Differing Site Conditions

Differing site conditions are described as:

o Subsurface or latent physical conditions at the site differing materially from those indicated in the contract; or

o Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as being a normal part of the work provided for in the contract.

The premises on which the differing site conditions clause rests may be described as:

o The bidder is not expected to perform a complete subsurface site investigation prior to a submission of a bid;

o The contract bid price is proportional to the degree of risk that the bidder must provide in his competitive bid;

o The most cost-effective construction is obtained by accepting certain risks for latent or subsurface site conditions.

When encountered, the contractor will promptly notify you of differing site conditions before such conditions are disturbed.

In evaluating the need for a change order based upon differing site considerations you should review the contract documents, the instructions to bidders and the results of subsurface investigations (including the method of presenting the results to prospective bidders) carried out prior to preparation of the contract documents. Once the information is evaluated, make a judgement as to whether the site conditions differ materially from those indicated in the contract or those ordinarily encountered and advise the construction contractor accordingly.

Contractor claims based on differing site conditions are not allowable for grant participation if the contractor fails to notify you before the conditions are disturbed or if asserted after final payment.

o Errors and Omissions in Construction Drawings and Specifications

Errors and omissions in the construction drawings and specifications are usually design or drafting deficiencies and may occur on any project but particularly on large complex projects. They may be discovered by the A/E, project observer or construction contractor and may require a change order. The evaluation and resolution of change orders resulting from errors and omissions may be difficult to make, and you may wish to seek opinions from a third party experienced in design practices to aid in making a determination.

Not all errors and omissions necessitate an increase to the contract price or time, and the construction contractor may not have a right to a claim even though an error or omission has occurred. Contractor claims based upon errors and omissions are allowable for grant participation only to the extent that the costs would have been incurred and allowable if the work had been properly included in the construction drawings and specifications originally supplied to the contractor. If justified, a change order is negotiated and you may need to seek redress from the A/E in accordance with the terms of the A/E's subagreement.

o Changes Instituted by Regulatory Requirements

Compliance with applicable law or changes in law may necessitate a change order. Examples include the discovery of historical or archaeological objects, revisions to building codes or revised road construction plans. These changes should be well documented with sources, dates, correspondence, records and notes demonstrating that the requirements could not have been incorporated into the bidding documents prior to the bid date nor foreseen by either the A/E or construction contractor by means of a reasonably thorough prebid investigation.

o Design Changes

A design change is a modification to an existing adequate design and in order to be considered it should be cost effective and offer a net savings (including future O&M costs). Design changes usually originate as proposals volunteered by the construction contractor based on the construction incentive program (Section 11.1.2). Special care is exercised if the design change represents a substitution of equipment, material or construction technique to ensure that the nonrestrictive specifications or sole source procurement provisons are not violated.

Design changes may also result from a proposal to relocate the project site. This is a highly undesirable circumstance since it may result in construction contractor claims especially when done hastily in response to an unforeseen conflict. Addition or deletion proposals should not be accepted at face value as a careful review often reveals extensive costs and secondary effects.

Design changes must be carefully reviewed recognizing that considerable effort was expended in preparation and review of the existing adequate construction drawings and specifications. Careful evaluation of the implications surrounding such changes will eliminate proposals which lack merit.

- Overruns/Underruns in Quantities

Overruns/underruns result from a difference between the estimated bid quantity and the actual quantity required to complete the bid item. These differences occur only in unit price (cubic yard, linear foot, etc.) items. Your project observer or A/E should carefully note these items as the work progresses and, where appropriate, consider alternatives to preclude excessive overruns.

While not specifically required in the procurement regulations, most subagreements contain a provision for significant differences between the estimated bid and as-built quantities. Often a variation clause will allow negotiations and equitable adjustment in unit price where the difference is more than 15 percent. The negotiated change order may result in an equitable adjustment to either the contractor or you.

- Factors Affecting Time of Completion

Four actions affect the time of completion: termination for convenience, termination for default, suspension of work and time extensions. The conditions appropriate to termination for convenience or default are clearly stated in the contract documents. "Convenience" may require an equitable adjustment to the contractor while "default" may require enforcement of the performance bond provisions of the contract in accordance with the terms of the subagreement. In both cases, the assistance of legal counsel will be required in order to minimize or preclude litigation.

Conditions may arise which require you to temporarily suspend or interrupt work. These conditions are generally described in the specifications and may result in an equitable adjustment of costs to the contractor.

A time extension may be requested by the contractor and if justified, granted by you subject to approval of your reviewing agency and a formal grant amendment. Otherwise, the construction contractor is liable for changes resulting from the failure to perform the work within the allotted time. A commonly used mechanism for controlling unjustified time extensions is the insertion of the liquidated damages clause in the contract. The clause generally assesses a dollar amount paid by the contractor for each day that the time required to complete the project exceeds the contract time.

You should not ignore a justifiable request for a time extension as disapproval can result in a condition of constructive acceleration by the contractor to meet the specified deadlines. This occurs when a construction contractor incurs additional costs by increasing forces to overcome lost time (which occurred through no fault of his own) in order to avoid assessment of liquidated damages. The constructive acceleration costs may be recovered by the contractor in court action if the contractor's request for a time extension is judged justifiable.

Contractor claims resulting from delay or acceleration in the time of completion are allowable for grant participation if they (1) were incurred in the best interests of completing the project, and (2) were not caused by events within your control or events within risk properly placed on the contractor.

Preparation for Negotiations

Before entering negotiations for a change order you should become totally familiar with the options and incentives provided in the contract documents. Application of these tools will stimulate the construction contractor to negotiate meaningfully.

The bilateral change, rather than the unilateral change, is one agreed to by both parties and is more desirable since it minimizes cause for disputes and claims at a later date. Should meaningful negotiations fail, you may exercise the authority to issue a unilateral change. For a unilateral change the construction contractor, whose concurrence is not required, is entitled to an equitable adjustment for any differences in cost resulting from that change.

In preparing for change order negotiations you should consider the following:

o Quality control - Quality of materials and workmanship may be a negotiable item in some change orders. A change order proposal is to include a detailed description of the work plus a specification clearly defining quality of materials and workmanship.

o Cost - Most change clauses specify an equitable adjustment to be agreed upon. The goal of the equitable adjustment would leave the construction contractor in the same profit or loss position on the basic contract after the change order as if there had been no need to change the contract. You should establish the cost of the change, insofar as possible, before the start of work. Retroactive pricing is undesirable. Your A/E may prepare an independent cost estimate which can be compared with the contractor's proposal and form a basis for negotiation.

o Alternative methods - There are generally a number of alternative methods of meeting the objective of the proposed change. The construction contractor can often suggest economies in methods or materials not apparent to you. The cost effectiveness of the alternatives presented are compared taking into account capital costs and future O&M costs.

o Secondary effects - A seemingly minor contract change may have secondary effects which are many times more costly than the original change order amount. Assessment of secondary effects requires a thorough understanding of the project design, bidding documents, construction contractor's schedule and construction techniques.

An example of a secondary effect could be a proposal to increase the size and capacity of a pump. The proposed pump may no longer be compatible with intake or discharge piping, housing, power source, mounting hangers or electrical controls. A second example may be a change that could result in additional A/E fees for design modifications, and if the change results in an extension of time, additional observation costs.

o Time - Time affects price and it is unlikely that a realistic price can be negotiated without agreeing to the time adjustment required. Deferment of time negotiations to a later date is undesirable. Approval of a time extension obligates you to fund the extended A/E services and observation costs. However, approval of a time extension does not relieve you of any obligations imposed by your NPDES permit or the reviewing agency.

Memorandum of Negotiations

As part of the preparation for project audit, it is good construction management practice to keep a memorandum of the negotiations pertaining to a change order. A record of negotiations documents that you and the contractor have a clear understanding of the proposed changes and jointly evaluated the reasonableness of the proposal. The negotiations and record should specifically address quality, cost, alternatives, secondary effects and time. The memorandum should be prepared at the negotiating table and signed by all parties attending.

Agreement may not be reached on all or any items discussed and may result in the preparation of a unilateral change order followed by a contractor claim. The reasons for disagreement are clearly documented in the memorandum. Suggested information to be included in the memorandum of negotiations includes project name, number and location, date, parties in attendance, description of proposed change (including drawings, sketches, etc.), alternatives evaluated, contractor's price proposal, A/E's cost estimate, explanation of disagreement, summary of total costs (including secondary costs), time changes, and signatures of parties attending.

The memorandum of negotiations is not a notice to proceed with the work but forms the basis for preparation of a change order.

Preparation of Change Order

The change order is the formal document which alters some terms of the contract documents. It summarizes, from the memorandum of negotiations, the agreed upon change and includes: an identification number of other convenient reference, description of change, contract or unit price changes, and change to contract time. The change order is signed by both parties, submitted to the reviewing agency for approval where required, and a notice to proceed issued to the contractor after approval.

14.3.2 ONSITE OBSERVATION

Provide adequate engineering and observation during the course of construction. Depending on the size and complexity of the project, your observations may require periodic site visits or a full-time onsite observer. During construction the reviewing agency or COE may make periodic onsite reviews to ensure that the project is being managed properly, is on schedule, and is being constructed in accordance with approved construction drawings, specifications and change orders.

The reviewing agency may make both interim and final onsite reviews. In most cases, the reviewing agency will send you a sample form to be completed during the onsite review. You should notify your project team and contractors of the pending review and gather documents and other necessary data. Items typically observed at the time of an interim onsite review include:

o Adequacy of engineering supervision and observation;

o Availability of approved construction drawings, specifications and change orders at the project site;

o Conformance of construction to approved drawings, specifications and change orders;

o Comparison of latest estimate of work-in-place with the actual observed construction;

o Review of test reports for materials and equipment;

o Protection and storage of delivered equipment;

o Display of appropriate project sign and posting of appropriate wage rate determination;

o Review of project accounting records noting if they distinguish between allowable and unallowable costs, and are supported by receipts or invoices;

o Implementation of special construction techniques including erosion and sediment control measures and other measures to protect the environment;

o Hiring and training of operational staff in accordance with the plan of operation;

o Progress on the preparation of the O&M manual;

o Progress toward enacting the user charge system and sewer use ordinance before beginning operation of the treatment works;

o Maintenance of schedule for sewer system rehabilitation if appropriate;

o Adequacy of treatment (no bypassing) during construction;

Final onsite reviews will be made within 60 days after your request. The final onsite review should include the above items and a determination that:

o Facilities are complete, operating and meet effluent limitations contained in the NPDES permit including pretreatment requirements;

o Facilities conform to the approved construction drawings, specifications and change orders;

o Equipment is operational and performing satisfactorily;

o Operation and maintenance staff is hired and trained in start-up and operational procedures;

o Laboratory facilities are complete and appropriate tests are being performed;

o O&M manual is onsite and operators are trained in its use and application;

o Accounting records are adequate and available for audit;

o Sewer system rehabilitation is on schedule, if appropriate;

o User charge systems and sewer use ordinances have been enacted and being enforced;

o Provision for continuation of engineering services during the first year of operation;

o Flood insurance is provided for the useful life of the project;

o Property management procedures and property inventory is satisfactory.

The onsite reviewer will discuss any deficiencies, furnish you a copy of his completed report and confirm in writing agreements resulting from your discussions.

14.4
PAYMENT REQUESTS AND LIMITATIONS

Interim and final grant payment requests are prepared and processed in accordance with the procedures outlined in Section 15.4. At the time of onsite review, payments will be compared with the actual construction completed. Construction contractor payment requests are based on the work completed or equipment delivered to the site and are generally supported by your contractor's estimate of work-in-place as approved by the A/E. Grant payments are limited to 50 percent unless a satisfactory final plan of operation has been furnished to the revewing agency and 90 percent until a satisfactory O&M manual has been submitted.

14.5
PLAN OF OPERATION

The plan of operation (Section 12.4) is important to ensure successful start-up of your treatment works and to ensure continued compliance with your NPDES permit. Initially, the plan of operation focuses on staffing, training and operation of the treatment works. However, equally important are the administrative aspects of protecting your investment. Each year an adequate budget is prepared indentifying the basis for determining the annual O&M cost and the cost of personnel. You, as the project owner, will establish salary levels which should be commensurate with the complexity of operating your treatment works and adequate enough to attract and retain competent, dedicated employees.

14.6
PROJECT PERFORMANCE

It is common practice for most municipalities to procure an A/E firm or construction management firm to supervise building of the project (the alternative is using qualified municipal employees). The firm may be the A/E who prepared the project design, a different firm specializing in construction management or a combination of both. The traditional engineering services provided during the building of a project include: technical observation of the building to ensure completion and conformance with the construction drawings and specifications; providing expert opinion on changes to the project including the preparation of independent cost estimates; and in general, acting as a technical advisor. The specific scope of work including duties and responsibilities is enumerated in the A/E subagreement.

The 1981 amendments to the CWA recognize the need for continuing the professional engineering services beyond the completion of construction and initial startup of the project. Specifically, the amendments require that you continue your relationship with the prime engineer, i.e., the engineer principally responsible for providing design services or the engineer principally responsible for providing A/E services during building of the project, during the first year following the initiation of operation. For the purposes of this requirement, initiation of operation of the treatment works may take place any time when the entire treatment facility, including all plant coponents and unit processes or projects such as interceptor sewers or sewer rehabilitation, have become fully operational. The first year of operation may include the time necessary for acceptance, beneficial occupancy or performance testing of major equipment items, wet testing of plant components or final inspection. However, you should select a specific date within this time period to officially start the first year of operation. You may also start the first year of operation for project segments or operable components which have performance specifications or measurable outputs clearly defined. In either case, the initial operation should be followed by sustained operation of the project or group of projects which are under performance evaluation.

The services to be provided by the prime engineer during the first year following initiation of operation include the following:

o Supervise the operation of the project and revise the O&M manual as necessary to accommodate actual operating experience;

o Train operating personnel and prepare curricula and training material for operating personnel;

o Observe and periodicelly report on the performance of the project; and

o Provide advice as to whether the project is capable of meeting the performance standards.

On the date one year after initiation of operation certify to your reviewing agency whether or not your project is capable of meeting the project performance standards. If you cannot certify that the project is capable of meeting the performance standards, provide a corrective action report which includes an analysis of the cause of the problem (including I/I reduction) and an estimate of the nature, scope and cost of corrective action necessary to bring the project into compliance. The report should also include a schedule for the timely correction of the problem(s) and the estimated date by which you will be able to certify that the project does meet the performance standards. The cost of corrective action necessary to bring the project into compliance will be at other than Federal expense except in the case of innovative or alternative technology projects meeting the qualifying criteria for repair, modification or replacement grants. Failure to bring the project into compliance may result in remedial action by EPA and may also result in an audit of your user charge and financial management system.

Recognizing that you are responsible for submission of the certification above and the costs for any corrective action required, you may wish to consider including guarantees or other protections in your subagreements with your engineer, contractors, equipment suppliers or others. In so doing, you should examine the timing of coverage for insurance, warranties and bonds in relation to the initiation of operation. In this way, you can carefully consider the timing of the project, the date for initiation of operation and the various forms of coverage such that problems associated with engineering, construction and equipment can be resolved promptly.

As you consider possible ways of assuring project performance, note that:

o The prime engineer is not a municipal employee;

o Engineering costs associated with extended one year guarantees are allowable for grant participation;

o The level of engineering services for interceptor sewers or sewer rehabilitation projects will be proportionately less than that required for a treatment facility.

The following diagram illustrates functional relationships between the various parties associated with the construction and performance of the project.

Nothing in this section is to be construed to prohibit you from requiring more assurances, guarantees or indemnity or other contractual requirements from any of your contractors.

PART IV. FINANCIAL AND PROCUREMENT CONSIDERATIONS

CHAPTER 15

FINANCIAL CONSIDERATIONS

15.0 ALLOWABLE AND UNALLOWABLE COSTS

Not all costs associated with your wastewater treatment project are allowable for grant participation. Appendix A to 40 CFR Part 35 Subpart I provides a specific list of allowable and unallowable costs based on the CWA and Federal cost principles. The list should be consulted as you prepare a grant application, a payment request or during audit as appropriate.

Questions of clarification or requests for inclusion of costs as allowable and not otherwise determined are to be made through your reviewing agency. Final decision concerning allowability of costs will be made by the Administrator of EPA if necessary.

Resolve questions of allowable costs as early as possible to preclude potential adverse financial impacts upon your community from decisions made after Federal audit.

15.1 REPLACEMENT COSTS

Grant assistance is authorized for treatment works including new facilities or extensions, improvements, remodeling, additions and alterations to existing facilities. Grant assistance is not provided to replace, through reconstruction or substitution, treatment works that fail prior to initiation of operation or fail to meet project performance standards

Responsible Party	Municipality	A/E	Construction Contractor	Equipment Supplier
Functions	Manage project Procure services	Design project Prepare drawings and specifications	Build facility Install equipment	Fabricate and deliver equipment
Responsiblity	Operate facility Certify compliance	Process compatibility Meet design standards	Performance Reliability	Performance Reliability
Needs	Obtain A/E assistance Obtain legal assistance Obtain construction management	Insurance for error and omissions	Guarantees and bonds for equipment and performance	Warranties for bonds for equipment and performance

TABLE 4. GRANTEE AND CONTRACTOR RESPONSIBILITES

and which were constructed with Federal grant assistance after October 18, 1972 (except innovative or alternative (I or A) projects).

15.2 INNOVATIVE AND ALTERNATIVE (I&A) TECHNOLOGY REPLACEMENT GRANT

During facilities planning you evaluated I&A technology projects as a potential cost-effective solution to your wastewater problem. In addition to the cost or energy savings which I&A projects realize, an additional incentive authorized by the CWA is a 100 percent modification or replacement (M/R) grant if the project fails within two years following final onsite review.

The key to implementation of I&A projects is the acceptance of an acceptable level of risk by you that the I or A project may not work as predictably as a more conventional treatment process.

For the purpose of 100 percent M/R funding, failure is defined as the inability of the entire system or significant components to meet design performance specifications, where such failure is due to higher risk elements of design as determined in the original design documents. M/R 100 percent funding is not available where the failure of an I or A system or component is covered by a warranty or caused by negligence.

Where failure occurs, you are encouraged to pursue independent corrective actions as part of the procedures to establish a firm basis for requesting M/R grant assistance.

Evaluation of requests for 100 percent M/R grants involves a determination that: (a) design performance specifications have not been met; (b) the failure results in a significant increase in O&M costs and/or requires additional significant capital expenditures to correct the problem; and (c) the failure is not attributable to negligence on the part of any person. Negligence should be evaluated as the last item since the determination is based upon both technical analysis and legal findings.

Initial screening will reject from further consideration projects which do not qualify for obvious reasons and, therefore, do not require a detailed evaluation. Such reasons may include expiration of the two-year period, hydraulic or organic overloading of the system or lack of an adequate O&M program.

A performance evaluation should be made in those cases where it is initially determined that a legitimate problem exists and failure of an I or A technology is the probable cause. The performance evaluation should address the following areas:

o Description of the failure including date of occurrence, manner of failure, and effects of failure;

o Evaluation of the current O&M program;

o Evaluation of system design, including analysis of process theory and identification of potential design deficiencies which may impact system performance operation;

o Identification and evaluation of potential construction deficiencies contributing to the failure;

o Evaluation of equipment performance and warranties;

o Identification of impact of climate on overall performance;

o Evaluation of process warranties and performance guarantees; and

o Description of outstanding claims and issues of negligence, where appropriate.

15.3
FORCE ACCOUNT

As a matter of public policy, use of private firms for project work is encouraged. However, some of your project work may be performed more efficiently and economically using municipal employees. This procedure is termed "force account." You may use this procedure if costs are properly documented for Step 3 work only. The costs for force account work, if any, during facilities planning and project design are not allowable for grant participation.

Where it is proposed to use force account during Step 3, certain restrictions and limitations are imposed to ensure the proper use of public funds.

15.3.1
PRIOR APPROVAL

Prior written approval by the reviewing agency is needed for the use of force account. Approval is based on overriding reasons for force account rather than private firms and can be given only if one of two criteria is met:

o The work can be accomplished more economically by the use of this method compared with competitive bidding procurement;

o Emergency circumstances dictate its use.

To satisfy the criteria of improved economy you should substantiate:

o That all anticipated project administrative costs including salaries of administrative employees and travel expenses have been included and are allowable for grant participation;

o The proposed method of timekeeping and timechecking;

o The method of establishing wage scales for laborers, mechanics, and supervisory employees;

o The indirect cost rate and its method of allocation to the project;

o The method for computing allowances for use, repair and overhaul of municipal equipment, rental rates and period of use for rental equipment;

o The method of computing depreciation costs of small tools and other expendable items or equipment;

o The method of disposing of unused materials and tools and any appropriate cost adjustments.

15.3.2
OTHER FORCE ACCOUNT CONSIDERATIONS

In addition to substantiation of improved economy, additional controls are needed, such as:

o Adequate cost accounting records substantiating direct and indirect costs;

o Employee time sheets approved and signed by a supervisor accounting for all hours worked in a day or week by project (whether or not the project is Federally funded);

o Control procedures ensuring that all materials, supplies, equipment and labor cost charged to the project are actually used in connection with the project;

o Assurance that the Copeland Anti-Kickback Act provision will be enforced;

o Adequate insurance including fire and extended coverage, workmen's compensation, public liability and property damage, and "all risk" in accordance with local or State law.

The force account method of performing small portions of project work requires careful analysis and planning beforehand and management and cost control after work is initiated.

15.4 PAYMENTS

Three needs arise with regard to grant payments: (1) your need for timely payments to contractors, (2) your need for timely payments from EPA, and (3) EPA's need to project outlays for financial management control. These needs can best be met when there is agreement initially as to amount and timing of payment requests. At the time of grant application you should prepare a schedule of anticipated grant payments indicating months from grant award and estimated amount of each payment. Include in your first construction payment request the allowance for facilities planning and project design. For Step 2+3 projects 30 percent of the Federal share of the allowance will be paid as soon as requested after grant award, an additional 35 percent when the design is 50 percent complete and the final portion after award of building subagreements. Payment schedules may be modified in consultation with the project reviewer. Your requirements are combined with those of other projects and used for forecast Federal outlay requirements for the fiscal year.

EPA has a goal of 22 calendar days from receipt of your payment request to your receipt of a check from the Department of the Treasury. This presumes your payment request is consistent with the work progress, is not held up for a specific reason (e.g., plan of operation), and is in line with your payment schedule. Grant payments are based on costs incurred. You should consider payment policies and procedures that will reduce the cost of the contract. These include payment discounts to determine the low bid, progress payments to A/E's and construction contractors, and minimum retainage from progress payments.

Payment discounts are governed by EPA procurement regulations. However, progress payments and retainage from progress payments may be governed by your state law. You may make progress payments for the amount and value of work and services performed. You may also make progress payments for materials or equipment delivered to or stocked near the construction site, and undelivered specifically manufactured items or equipment, if provisions regarding appropriate insurance, security, and protection of the federal and grantee interests in progress payments are included in your contract documents. If your contractor is making satisfactory progress, and there is no other specific reason for withholding a portion of the progress payments, you should retain only that amount necessary to assure completion of your project.

Care in preparing payment requests and contact with the payment official will expedite processing of your payments. If payments are not made promptly by you to your contractor, interest will be recovered at audit.

15.4.1

PREAWARD COSTS Regulations applicable to projects receiving grant awards after December 29, 1981 do not allow grant participation in costs incurred prior to grant award with the exception of Step 3 work required by emergencies, instances where delay would result in a significant cost increase, or for acquisition of real property, and only with prior approval and after an environmental review has been completed. Significant cost increases may include such items as advance acquisition of major equipment items requiring long lead times, field testing of I&A technologies, minor sewer rehabilitation including concurrent pressure testing and sealing of sewer joints, inflow source removal and other sewer repairs that will not result in a need for public meetings or upset the State project priority system.

If you believe that work on your project must begin before grant award and if you meet this criterion, contact your project reviewer for additional guidance. Approval of preaward costs does not obligate EPA to subsequent payment unless a grant award is made.

15.4.2

INTERIM PAYMENTS Procedures for filing interim payment requests (EPA Form SF-271, Outlay Report and Request for Reimbursement for Construction Program) vary from region to region or State to State. The frequency and dollar amounts should agree with the payment schedule in your grant agreement and any other special grant conditions.

One item needing clarification from your project reviewer concerns supporting documentation, if any, which is to accompany a payment request. For instance, such documentation may include invoices from your A/E or the A/E's estimate of work-in-place.

15.4.3

FINAL PAYMENT Final grant payment for building the project will be made after satisfaction of all applicable regulations and any special grant conditions, and only after completion of a final onsite review. The final grant payment for building the project is the balance of the Federal share of the allowance and the allowable project costs adjusted to actual costs incurred. The last Federal grant payment will be made one year after initiation of operation and include all allowable costs associated with project performance (Section 14.6).

The Federal share of refunds, rebates or other amounts (including any interest) that accrue to the project are credited to the State allotment or paid to EPA.

By accepting the final payment you agree to release and discharge the United States, its officers, agents, and employees from all liabilities, obligations and claims arising out of the project work or under the grant, subject only to exceptions previously specified in writing between you and the reviewing agency.

15.5
GRANT INCREASES/ DECREASES

Grant increases/ decreases are most often associated with construction and are discussed in Section 14.1.

15.6
AUDITS

By accepting the grant you agree that all project related books, documents, records and papers and those of your contractors are accessible to the reviewing agency or its authorized representatives for audit purposes. The objective of the audit is to determine whether financial operations are conducted properly, the financial statements are presented fairly, you complied with laws and regulations affecting the expenditure of Federal funds, internal procedures were established to meet the objectives of the grants program and financial reports contain accurate and reliable information.

You will need financial records which establish an audit trail substantiated by receipts and disbursements. In addition, the audit will ensure that Step 3 or approved preaward procurement procedures were properly followed. For example, your records may show that you purchased, received and paid for a piece of equipment. If the equipment price exceeded $10,000, you should have received competitive bids and purchased from the lowest responsive, responsible bidder. If you did not receive bids or don't have records of your procurement action, the cost of the equipment may possibly be excluded from Federal grant participation.

15.6.1
FINANCIAL RECORDS

Your grant assistance financial records should be kept separate from your other municipal financial records. Where cross referencing is necessary, it should be provided.

The accounting records typically include:

- o Cash receipts register;
- o Check disbursement ledger;
- o Cost control ledger;
- o Journal voucher;
- o Payroll records, if applicable;
- o Property record, if applicable.

The accounting system should be on a double entry basis with a general ledger. The financial management system should include a series of checks and balances and have a clear separation of functions and approval levels. Your accountant should be familiar with these practices and may obtain additional guidance from EPA's "Accounting Guide for Construction Grants," October 1977, prepared by Office of Resources Management, Financial Management Division.

15.6.2
AUDIT PROCEDURES AND REPORTS

After final onsite review by the reviewing agency and satisfactory resolution of any deficiencies, your project is ready for audit. Keep the project records in a safe place and under your control.

The audit will be performed by the reviewing agency, other Federal agencies or an accounting firm hired by the reviewing agency. The auditors will contact you to arrange an appointment for audit purposes. Auditors will obtain preliminary information from the project files. During the audit of your records the auditors will monitor your files for further documentation and run spot tests to verify specific items. The audit may last from a few days to weeks and you should provide adequate work space and make available those employees who may be able to respond to questions raised by the auditor.

At the completion of the audit, the auditors will prepare an audit report and review it with you. If exception is taken to some of the items you claimed for grant participation, you have an opportunity to discuss it with the auditor and provide additional information or documentation which could reverse the initial decision.

The draft audit report is sent to the reviewing agency for action. The respective staffs discuss with the auditors any exceptions and try to resolve differences. During this time you may provide further clarifying documentation or explanations. You will be advised of the findings and decisions on all exceptions. If you disagree with the findings, appeal procedures are available to you as discussed in the regulations (40 CFR Part 30 Subpart J).

CHAPTER 16

PROCUREMENT

16.0 INTRODUCTION

The purchase of goods and services is procurement. The objective of a procurement system is to obtain needed goods and services at a fair and reasonable price through the use of free and open competition appropriate to the type of project work to be performed. When tax dollars are involved, it is necessary to impose safeguards in public procurement to protect against potential fraud and irregularities.

In Chapter 11 aspects of procurement related to project design and the preparation of construction drawings and specifications (e.g., buy American, bonding, single material, etc.) are discussed. Procurement actions related to management of change orders are discussed in Chapter 14. This chapter, however, provides guidance from an overall perspective to assist you in understanding and satisfying the Federal minimum requirements for procurement. This guidance is not regulation, and you may follow other procedures which satisfy the minimum requirements of EPA's procurement regulations.

The EPA procurement regulations entitled (40 CFR) "Part 33 - Procurement Under Assistance Agreements" reflect changes to and a consolidation of earlier procurement regulations and became effective on May 12, 1982. These regulations when combined with the 1981 amendments to the CWA, shift most of the responsibility for conducting procurement to you, the grantee. For example, you may certify that your procurement system meets the Federal minimum requirements and, therefore, your procurement actions will not normally be reviewed by your reviewing agency. Also, since grant assistance will be provided only at the time you are prepared to initiate construction, there will be no Federal oversight of your procurement action for goods and services required in preparing your facilities plan and project design. The full responsibility for procurements prior to grant award and possibly thereafter rests solely with you. In order to protect your interests you should give careful consideration to the procurement procedures you use and particularly to cost or price analyses.

In the discussions which follow the term "grant agreement" refers to the agreement and amendments between you and EPA. The term "subagreement" refers to the agreement between you and a contractor (A/E, construction contractor, etc.). The term "lower tier subagreement" refers to the agreement between your contractor and a subcontractor.

16.1
PROCUREMENT CERTIFICATION

At the time of grant application you will complete and submit to your reviewing agency "Procurement System Certification Form for Applicants For EPA Assistance" (EPA Form 5700-48). The information in the form will assist you in determining and certifying whether or not your procurement system meets the Federal minimum requirements. Wherever possible, you are encouraged to use your own procurement system if your system meets the Federal minimum requirements. You may also wish to consider modifying your system as appropriate to include some of the Federal requirements which may not presently be in your system (e.g., cost and price analysis). Intentional misrepresentation on the certification form may jeopardize your grant or require other remedial action by EPA.

The principal advantage to using your procurement system (assuming it meets the Federal minimum requirements) is that once you have certified affirmatively you need not submit documentation for each and every procurement action to your reviewing agency and await their approval before awarding a subagreement. This, in turn, saves both time and paperwork for you and your reviewing agency. A second advantage is that your procurement system will probably satisfy the procurement requirements of other Federal agencies from whom you may obtain loans or grants. Adoption of a new system or modification of your existing system to meet Federal minimum requirements results in a procurement system which will serve you well for all municipal procurements regardless of whether or not Federal funds are involved.

If you are unable to make an affirmative certification or do not wish to adopt a procurement system which meets the Federal requirements, certify that you will follow the requirements of 40 CFR Part 33 including reviewing agency preaward approval of proposed procurement actions.

16.2
PROCUREMENT MANAGEMENT

This and the following sections describe good procurement management practices based on the EPA regulations. While following these practices is not mandatory, you are encouraged to consider their use.

It is recommended that a public official, preferably a full-time municipal employee, be assigned responsibility to coordinate all procurement actions. This person may be titled "purchasing agent," "procurement officer," "procurement manager," or other similar title which conveys job responsibility. The purchasing agent (PA) should be or become very familiar with the procurement system you will use and act as a clearinghouse for all matters concerning procurement.

The PA should maintain detailed documentation of all procurement actions. The documentation should include:

- Correspondence;
- Logs of telephone and personal conversations;
- Minutes of meetings;
- Basis for contractor selection;
- Justification for the selection of the procurement method;
- Selection of type of sub-agreement;
- Basis for award cost or price, including a copy of the cost or price analysis and minutes of negotiations;
- Basis and justification for rejection of any or all bids;
- Bid tabulations and contract documents;
- Payment files;
- Protest files.

As a general policy the PA should document in writing anything that has to do with procurement and maintain the records for review at the time of Federal audit. The PA should also duplicate or summarize the section of your procurement system concerning a code or standards of conduct in public contracting and distribute it by memorandum to every municipal official and employee. The intent of the distribution is to alert employees that a code of conduct exists and to preclude conflicts of interest before they arise.

16.3 METHODS OF PROCUREMENT

The following are four different methods of procurement which may be used depending upon the circumstances: (1) formal advertising, (2) competitive negotiation, (3) noncompetitive negotiation, and (4) small purchase. For all subagreements expected to exceed $10,000, the use of the formal advertising is preferred although there are instances when you cannot draft an adequate or realistic purchase description to meet the elements of formal advertising. In those circumstances you are encouraged to use the competitive negotiation method. The least favored procurement method is noncompetitive (i.e., sole source) negotiation. For purchases which are anticipated not to exceed $10,000, follow the small purchase rules.

It should be noted that EPA procurement regulations prohibit practices which unduly restrict or eliminate competition. Examples of practices considered to be unduly restrictive include:

- Placing unreasonable requirements

on firms in order for them to qualify to do business;

- o Noncompetitive practices between firms;
- o Organizational conflicts of interest;
- o Unnecessary experience and bonding requirements; and
- o State or local laws, ordinances, regulations or procedures which give local or in-State bidders or proposers preference over other bidders or proposers in evaluating bids or proposals.

16.4 FORMAL ADVERTISING

Formal advertising is the preferred method of procurement for subagreements in excess of $10,000 and is the most common method used to procure construction contractors. Formal advertising includes competitive bidding procedures and, in general, follows the following steps:

- o Solicitation for bids - a formal public announcment that sealed bids will be received for the specified work;
- o Bid receipt and opening - public opening of bids;
- o Bid evaluation - evaluation to determine the lowest responsive, responsible bidder;
- o Subagreement award.

The following sections describe each of these steps as related to the procurement of construction contractors. Other formal advertising procurements will follow essentially the same procedure.

16.4.1 SOLICITATION FOR BIDS

A formal public notice, more commonly called an "Invitation for Bids," is placed in newspapers, trade journals, and generally in the case of large projects, in publications with nationwide distribution. The public notice describes your project, indicates where bidding documents including construction drawings and specifications may be obtained and specifies a time, date and location for opening of bids. Adequate time (generally a minimum of 30 days) is allowed between the date of public notice and the date of bid opening.

16.4.2 BID RECEIPT AND OPENING

Bids are received in sealed envelopes from prospective contractors and publicly opened at the date and time specified in the public notice. Bids are briefly reviewed for completeness and the name and amount of each bid is read aloud. Obvious discrepancies are noted and announced. After all bids have been opened, you announce the name and price of the apparent low bid or bidders.

During bid receipt and opening it is possible that a problem may arise (late bidder, incomplete submission, etc.). You may wish to have your A/E or attorney present at bid opening since the procedures you follow may require their advice.

16.4.3 BID EVALUATION

Your A/E and attorney will review bids, check arithmetic computations, check references, insurance coverage, bid bonds, minority and women's business goal compliance, etc. Bids are evaluated in accordance with the criteria described in the bidding documents (Section 11.1). All bids may be rejected only when there are sound, documented business reasons to do so. Subagreements are to be awarded to the lowest responsive, responsible bidder.

If you are using a certified procurement system (Section 16.1) and assuming bids are within your estimate and therefore do not require a grant amendment, you may award subagreements as soon as desired after bid opening. If a grant increase is necessary, contact your reviewing agency before contract award (Section 14.1).

If your procurement system is not certified, submit the following information for approval to your reviewing agency:

o A certified tabulation of all bids received;

o Copies of the proposal form and bonds from the successful bidder(s);

o A statement from your authorized official giving the names of bidders to whom you wish to award subagreements and the amount of each subagreement;

o Proof of public notice indicating the circulation dates and the time for receipt of bids;

o A copy of each addendum issued during the bidding period and acknowledgement of its receipt by the successful bidder;

o Signed copies of the certification by the contractors regarding compliance with Equal Employment Opportunity requirements;

o A justification indicating why the low bidder is not responsive or responsible if award is to be made to other than the low bidder;

o A revised project cost estimate as necessary.

If the bids differ from your A/E's estimate, it may be necessary to adjust your grant in accordance with the procedures in Section 14.1. Upon approval by your reviewing agency of your construction procurement procedures, and after adjustment of your grant if required, you may award subagreements.

16.5 COMPETITIVE NEGOTIATION

In most cases, procurement of services (other than construction contractors) related to the construction of treatment works employs the competitive negotiation method. This method, applicable to all subagreements in excess of $10,000, includes the following steps:

o Public notice - advertising your need for services and requesting proposals;

o Evaluation of proposals - a determination of the qualified offerors and proposed prices;

o Negotiation and award.

An optional procedure is available for the procurement of A/E services. It differs from the above steps in evaluation criteria, negotiation, and use of the prequalified list. The following sections briefly describe each of these steps.

16.5.1
PUBLIC NOTICE

The objective of the public notice is to announce your need for services and request proposals from qualified firms. Your public notice should receive wide circulation and include a notice in journals, newspapers or publications of general circulation over a reasonable area. Reviewing agencies may be of assistance and provide you with a list of qualified firms.

The public notice describes the scope of services required, the method by which associated documents may be examined, the evaluation criteria (including the relative importance attached to each criterion), and the deadline and place for submitting proposals.

16.5.2
EVALUATION OF PROPOSALS

Proposals are to be uniformly and objectively evaluated in accordance with the criteria stated in the public notice. The objective of the evaluation process is to identify the best qualified and qualified proposers. If the criteria in the public notice states that award will be made solely on the basis of the initial proposals, a subagreement is awarded to the best qualified offeror.

16.5.3
NEGOTIATION AND AWARD OF SUBAGREEMENT

If award of a subagreement is not based solely on evaluation of initial proposals, you may conduct negotiations with all of the best qualified firms. Each of the best qualified firms is given the same opportunity to negotiate or revise their proposals. A subagreement is awarded to the firm whose proposal is determined to be the most advantageous to you, taking into consideration price and other evaluation factors stated in the public notice.

16.5.4
OPTIONAL A/E NEGOTIATION PROCEDURE

If the subagreement to be awarded is for A/E services and if price is not an evaluation factor set forth in the request for proposals, the following procedure may be used for A/E selection.

Prequalified List

Proposals may be requested and a subagreement awarded to a firm on a prequalified list provided:

o The prequalified list was developed using public notice (Section 16.5.1) procedures;

o The prequalified list is updated at least every six months;

o A decision is made concerning an A/E's qualifications within 30 days of receipt of a request from the A/E to be placed on the prequalified list.

Request for Qualifications

While not required nor prohibited by the EPA procurement regulations, a convenient mechanism used by many municipalities for initially screening candidate firms is the use of a request for qualifications (RFQ). The RFQ is included in your public notice (Section 16.5.1) and requests firms to express their interest in working with you on a specific project. The RFQ provides candidate firms an opportunity to present in writing their qualifications and related experience. The RFQ generally does not request prices and is followed by a request for proposals to those candidate firms judged qualified. After receipt of the qualification statements either the purchasing agent or a committee of municipal officials reviews them and selects several firms which are found to be the best qualified. Often, in evaluating firms it is helpful to contact past clients to determine how well the firm performed. Documentation of the RFQ responses and the criteria used to select the qualified firms is essential. Notify unsuccessful firms of your decision and request proposals from the firms selected.

Request for Proposals

The following description of a request for proposals (RFP) is particularly applicable to the procurement of A/E services and provides additional details of information to be contained in a public notice (Section 16.5.1), for use with the prequalified list, or following the optional RFQ procedure described above. In general, the RFP should describe in detail your project requirements including such items as:

- Existing facilities;
- Time requirements for RFP submission and completion of the project work;
- Unique problems;
- Previous studies;
- Persons to contact if the firm has questions or wishes to visit the project site;
- Criteria to be used in evaluating proposals and relative importance of each criterion;
- A notice that the firm will be subject to Federal cost principles and that municipal, State of Federal officials may require access to the firm's records.

Request that firms prepare a detailed technical proposal of how they would undertake your project work. You may also want to require that the firms specify by name their project officer and, if desired, make that person available for an interview during negotiations. The PA should document all telephone conversations, correspondence or other communications with candidate firms. If clarifying or additional information is provided to one firm, provide the same information to all other candidate firms.

After receipt of proposals either the PA or a committee of municipal officials reviews them and initially ranks the firms in the order of preference. Criteria which could be used in ranking include:

- Specialized experience and technical competence;
- Past record of performance (possibly contact previous clients);
- Ability to perform work in the time you require;
- Familiarity with your type of pollution problems;
- No personal or organizational conflict of interest.

The decision as to how much weight is given each of these and other criteria is yours (assuming that you do not show prejudice or bias based on frivolous criteria) but it must be set forth in the RFP.

You may wish to consider conducting interviews with the firms judged qualified. If so, you should allow approximately one and one-half hours for each interview. You may wish to require the firms to have the project officer they will assign to your project present at the interview. Most often firms will have a 15 to 20 minute presentation prepared. Thereafter, you will ask questions and evaluate responses. Ideally, you should have prepared in advance a series of questions which you will ask of all firms to use as a common basis for comparison. Should the interview result in a need for a revised proposal, request that the revision be submitted as soon as possible.

Negotiation and Award of Subagreement

After evaluating proposals and possibly conducting interviews, determine the best qualified firm based on your evaluation criteria. Negotiate the scope of work and corresponding compensation with that firm. If you are unable to reach agreement, formally terminate negotiations and begin negotiations with the next most qualified firm. Continue this procedure with each succeeding firm until you are able to reach agreement. A subagreement is awarded to the firm whose proposal is determined in writing to be the best qualified based upon the evaluation criteria in the RFP and after negotiation of fair and reasonable compensation.

16.5.5
OPTIONAL A/E CONTINUATION

EPA procurement regulations applicable to projects receiving grants before December 29, 1981 provided for the continuation of A/E services from one grant step to another without further advertising or competition. EPA no longer provides Step 1 nor Step 2 grants nor must you follow the EPA procurement regulations in procuring A/E services for facilities planning and design. However, EPA wishes to continue the earlier policy of A/E continuation provided that certain conditions are met.

o If you received a Step 1 or Step 2 grant prior to December 29, 1981 and procured A/E services in accordance with the then applicable procurement regulations (40 CFR 35.936, .937, .939), you may negotiate with the same A/E firm for Step 3 A/E services without further advertisement or competition.

o If during facilities planning and design conducted without the benefit of EPA grant assistance you procured A/E services in accordance with the following provisions of 40 CFR Part 33

- Competition (33.230)
- Small purchase (33.305-33.315); formal advertising (33.405-33.435); competitive negotiation (33.505-33.525)
- Documentation (33.250)
- Code of conduct (33.270 (a) and (c)

you may negotiate with the same A/E firm for Step 3 A/E services without further advertisement or competition.

16.5.6
COST AND PRICE CONSIDERATIONS

In competitive negotiation procurement, price should be one of the evaluation factors or criteria used in the selection process. In the optional A/E negotiation procedure, qualifications of the firm are the most important criteria and compensation is negotiated after initial selection. However, price is important and you should conduct a cost or price analysis. You need not obtain detailed cost and price data from a prospective firm but it is your responsibility to determine the reasonableness and necessity of the proposed cost. To establish the reasonableness and necessity of costs you should consider prices charged in the surrounding geographical areas for similar work, the complexity of the tasks involved in the work and the risk to the candidate firm. While there are no specific Federal guidelines for grant assisted wastewater treatment projects, in all cases of procurement exceeding $10,000 where there is no price competition, profit shall be negotiated as a separate element of price.

Recognizing that the Federal cost principles are applicable to your grant and all subagreements under your grant, a brief, simplified description of the basic elements of cost is provided below.

o Direct Costs - These are costs specifically incurred for your project and will generally include labor, travel, materials and supplies, and reproduction costs (for example, printing of multiple copies of construction drawings and specifications). Generally, the largest direct cost is labor.

o Indirect Costs - These are actual costs the firm incurs by providing the services you need and include rent, utilities, telephone, employee insurance and benefits, accounting functions, and other costs of running a business. Usually indirect costs are lumped together either as overhead, general and administrative burden, or a combination of both. Firms will generally apply the same indirect cost rate to all their projects. Indirect costs vary among firms with ranges between 100 and 200 percent. Most often indirect costs are shown as a percentage of direct labor. For example, if the direct labor is $100, the indirect cost may be $130 for a total cost less profit of $230. Indirect cost accounting systems vary widely and you are likely to encounter various methods.

One aspect of the Federal cost principles with which you should be aware concerns unallowable costs. Unallowable costs as used in this context are costs which many firms generally consider as overhead but which may not be included in computing the indirect cost rate on Federally financed projects. A few of the more clearly defined unallowable costs are: interest on borrowed capital, bad debts, advertisements or promotional materials, and entertainment. These costs may not be included in computing indirect cost rates where Federal funds are involved.

o Profit - This is the net proceeds to the owners of the business after all allowable costs have been deducted from sales. Because this definition of profit is based on Federal cost principles, it may vary from a firm's definition of profit. Profits are to be reasonable and reflect the complexity of the work and the elements of risk associated with it.

16.6 NONCOMPETITIVE NEGOTIATION

Noncompetitive negotiation is the least favored method of procurement and may only be used when the other procurement methods are not feasible.

Specifically, award of a subagreement on grant assisted projects employing noncompetitive negotiation may only be done under the following circumstances:

o An item is available only from a single source;

o Public exigency or emergency requires immediate action;

o Authorization by your reviewing agency;

o After solicitation from a number of sources, competition is determined to be inadequate.

16.7
SMALL PURCHASES Most procurement systems recognize that there are times when the procedures used could cost more than the savings they are intended to realize. Therefore, provisions are made in Federal Law for small purchases, i.e., purchases under $10,000. Your existing procurement system or State requirements may set a lower figure.

When you need to make a small purchase, contact suppliers and obtain a telephone price quotation or a brief written proposal. Try to obtain a reasonable number of quotations (ideally 3 or more) and make the most advantageous selection. Document your files to demonstrate that you consulted more than one source for the item but you need not advertise, negotiate, nor follow the other detailed procurement procedures.

16.8
SUBAGREEMENTS Some types of subagreements are preferable in certain instances and some are not allowed.

o Fixed Price - Where a scope of work can be clearly defined (such as in the procurement of construction contractors using bidding documents including construction drawings and specifications), a fixed price or lump sum subagreement is awarded. In the case of other services, where the scope of work can be clearly defined, a fixed price subagreement may be negotiated. This type of subagreement has a fixed price no matter what the final costs are unless a change in the scope of work (change order) is negotiated.

For services other than construction contractors, this type of subagreement is not used as extensively as the cost-plus-fixed-fee type for wastewater treatment projects primarily because of the difficulty of clearly defining the scope and limitations of work. Where applicable, however, the fixed price subagreement is the easiest to administer.

o Cost-Plus-Fixed-Fee (CPFF) - The most commonly used type of subagreement for services on grant assisted projects (other than construction) is the CPFF. With a CPFF subagreement a cost ceiling and fixed fee are established for the work. The ceiling cost is made up of direct costs and indirect costs. If, for example, the ceiling is $200 consisting of $100 direct costs, $100 indirect costs plus $30 fixed fee, but the project actually costs less (say $80 direct, $80 indirect), you pay only $190 ($80 direct, $80 indirect, but full fixed profit of $30). On the other hand, if the project costs are expected to exceed the ceiling, the contractor must advise you in advance and you either approve of the increased cost if justified or terminate the contract. The contractor is not required to incur costs in excess of the ceiling nor even complete the project unless you negotiate and authorize a new cost ceiling.

If the increased costs are for additional work within the original scope of services, the contractor does not receive any increase in fixed fee. If the additional work is beyond the scope of original subagreement, the contractor may be authorized to do the additional work but also may claim an additional fixed fee.

CPFF subagreements are used most often when it is difficult to accurately and clearly define all of the work.

o Percentage of Construction Cost - This type of subagreement is not allowed. Used many years ago, this type of subagreement established the price as a percentage of the construction costs. This is no longer acceptable when Federal funds are involved.

o Cost Plus Percentage of Cost - This type of contract applies a multiplier, including profit, to direct costs and is not acceptable when EPA funds are involved.

o Other Subagreement Types - Other types of subagreements exist, some acceptable, some less desirable. If you are dealing with an experienced firm that has previously done Federally assisted work, the firm will be familiar with acceptable forms of subagreements. Contact your reviewing agency if you have additional questions concerning the form of subagreements.

o Lower Tier Subagreements - Lower tier subagreements may employ the appropriate type of agreement described above. In addition, all lower tier subagreements must include provision for compliance with: minority and women's businesses (Section 16.9), cost and price considerations (Section 16.5.5), Federal cost principles (Section 16.5.5), and applicable subagreement clauses (Section 16.10).

16.9
MINORITY, WOMEN'S, SMALL AND LABOR SURPLUS AREA BUSINESSES

The Federal government has identified four groups for special consideration where Federal funds are involved.

o Minority business enterprises.

o Women's business enterprises.

o Small businesses.

o Labor surplus area businesses.

Each of these types of businesses should be afforded an opportunity to compete for the work you will undertake and you and your contractors have to fulfill specific responsibilities.

EPA, working with other Federal agencies, has established a policy to award a fair share of EPA financed work to small, women, and minority businesses.

Other Federal agencies, namely, Small Business Administration, Office of Minority Business Enterprise, and Department of Commerce have established lists of qualified small or minority firms. In addition, other trade or professional associations, such as the American Consulting Engineers Council or Associated General Contractors, also have compiled lists of small and disadvantaged firms. Each of these agencies will provide assistance to you as necessary.

You should take affirmative steps to assure that these businesses are used when possible. Affirmative steps include the following:

o Including qualified small, minority and women's businesses on solicitation lists;

o Assuring that these businesses are solicited whenever they are potential sources;

o Dividing total requirements, when economically feasible, into small tasks or quantities to permit maximum participation of these businesses;

o Establishing delivery schedules, where the work permits, which will encourage these businesses to participate;

o Using the services of the Federal agencies cited above;

o Requiring your contractors to comply with the affirmative steps above.

16.10
SUBAGREEMENT CLAUSES

Subagreements awarded under a grant assisted project should comply with the provisions of Subpart F to EPA's procurement regulations (40 CFR Part 33) or their equivalent as contained in your certified procurement system. Nothing in the EPA procurement regulations, however, prohibits you from requiring more assurances, guarantees or indemnity or other contractual requirements.

The EPA procurement regulations include subagreement clauses that:

o Describe subagreement clauses or their equivalent which are to be included in each subagreement (e.g., equal employment opportunity, anti-kickback, minimum wage, etc.);

o Describe 14 model clauses or their equivalent which are to be included in each subagreement (e.g., supersession, privity of subagreement, changes, differing site conditions, etc.).

The required (or equivalent) clauses, taken together, are intended only to provide a minimum level of protection to safeguard the reviewing agency's interests and, therefore, alone do not constitute a complete subagreement document.

You should consider additional clauses you feel appropriate to define a sound and complete subagreement.

16.11
PROTESTS

Protests of procurement actions may be lodged by construction contractors, A/E firms, equipment suppliers or anyone else with a direct financial interest adversely affected by your procurement action. Protests are filed with you, and it is your responsibility to resolve the protest in accordance with your procurement system procedures, Federal or State law or local ordinance.

When a protest is received, you may wish to contact your municipal attorney or your A/E as appropriate and arrange a meeting to determine how best to proceed. You may also consider whether it is appropriate to defer the protested procurement action. Document your files carefully and use registered mail for correspondence concerning the protest.

In general, most protest resolution procedures begin with an initial determination of whether the protest has a basis in fact, i.e., the protestor should state the alleged violation, cite the local, State or Federal law violated, and indicate how the protestor was financially harmed. If the protest appears valid, an investigation is conducted to determine the facts. If the protest is frivolous or without a basis in fact, the protestor is so notified. In addition, most procurement procedures address time limitations or other administrative constraints which, if violated, form a basis for protest denial.

In the simplest case you may be able to dispense with a frivolous protest quickly. More complex cases may involve court action. Therefore, act promptly and with advice from legal counsel.

The EPA procurement regulations only address the informal administration process that EPA will use for the rapid resolution of appeals of your protest resolution filed with EPA. Appeals may only be filed with and accepted by EPA when the protestor has exhausted all administrative remedies with you first. Thereafter, certain limitations (timing, notification, etc.) will determine whether EPA will accept or act on an appeal. If you are aware of an appeal being filed with EPA, you may wish to review the EPA regulations (Subpart G to 40 CFR Part 33) in order to understand the procedures EPA will follow.

One requirement of the EPA protest regulations should be noted however. Upon receipt by EPA of a protest appeal, EPA will promptly notify you and request that you defer award of the subagreement or subitem under protest. If you do not defer award, you bear the risk that the cost of the subagreement or subitem may not be allowable for grant participation if the protest appeal is upheld. If a protestor does not agree to a request from you for a reasonable extension of the bid or bid bond period during this time, either you or EPA can summarily dismiss the protest or appeal.

APPENDIX A

PRMs and POMs Discontinued or Cancelled Upon Publication of "Construction Grants 1982" (CG-82)

PRMs Cancelled:

The following PRMs are cancelled as they are included in 40 CFR Part 35 Subpart I, CG-82 or for the reasons specified.

75-25	Eligibility of Land Acquisition Costs for Land Treatment Processes.
75-39	Eligibility of Land Acquisition Costs for the Ultimate Disposal of Residues for Wastewater Treatment Processes.
77-5	Grant Eligibility of Land Acquisition by Leaseholds or Easements for Use in Land Treatment and Ultimate Disposal of Residues.
78-4	Grant Eligibility of Land Acquired for Storage in Land Treatment Systems.
75-35	Allowable Costs for Construction of Treatment Works that Jointly Serve Municipalities and Federal Facilities.
75-36	Value Engineering in the EPA Construction Grants Program.
75-37	User Charge System: Plan and Schedule.
76-5	Flood Insurance Requirements.
77-2	Grant Eligibility of Startup Services.
77-3	Plan of Operation for Municipal Wastewater Treatment Facilities.
78-1	Erosion and Sediment Control in the Construction Grants Program (as relates to Step 1 and Step 2 grants).
78-8	Rejection of Bids: Guidance for EPA Concurrence Function.
78-11	Toxicity of Chemical Grouts for Sewer Rehabilitation. No longer applicable.
78-12	Preconstruction Lag Management.
79-1	Safety Requirements for the Design and Operation of Chlorination Facilities Using Gaseous Chlorine.

Appendix A (continued)

PRMs and POMs Discontinued or Cancelled, etc.

PRMs Cancelled (continued)

79-1 Safety Requirements for the Design and Operation of Chlorination Facilities Using Gaseous Chlorine. Included in "Municipal Construction 1982."

79-2 Royalties for Use of or for Rights in Patents. Included in "Municipal Construction 1982."

79-5 Construction Incentive Program. Included in "Municipal Construction 1982."

79-9 Outlay Management in the Construction Grants Program. Included in "Municipal Construction 1982."

79-10 Qualification of Major Items of Equipment. Included in "Municipal Construction 1982."

79-11 Funding of Waste Load Allocations and Water Quality Analyses for POTW Decisions. Included in Appendix A to 40 CFR Part 35, Subpart I.

80-3 Management Reforms to Reduce the Time Interval Between Step 3 Grant Award and Initiation of Construction (Property Acquisition, Local Share Funding, Service Agreements and Cultural Resource Investigations). Included in "Municipal Construction 1982."

80-4 Implementation of Women's Business Enterprise Support Program. Included in "Municipal Construction 1982."

80-5 Buy American. Included in "Municipal Construction 1982."

80-7 Grant Eligibility of Minority Business Enterprise and Women's Business Enterprise Liaison Services. Included in Appendix A to 40 CFR Part 35, Subpart I.

81-2 Discount Rate. Included in "Facilities Planning 1982."

POMs Cancelled

The following POMs are cancelled for the reasons specified.

77-5 Agreements for Engineering Services. Included in "Municipal Construction 1982."

Note: All PRM's and POM's discontinued or cancelled by Facilities Planning 1981 (FP-81) have been incorporated into this document.

APPENDIX B

	LIST OF SELECTED PUBLICATIONS	Ordering Source & Number
1.	Analysis of Operations and Maintenance Costs for Municipal Wastewater Treatment Systems. FRD - 22, EPA 430/9-81-004	U.S. Department of Commerce Nat. Technical Infor. Serv (NTIS) 5285 Port Royal Road Springfield, VA 22161 Ordering No. PB 81-203713 (703) 487-4650
2.	Construction Costs for Municipal Wastewater Conveyance Systems. 1973 - 1979, FRD-21, EPA 430/9-81-003	NTIS (address above)
3.	Composting Processes to Stabilize and Disinfect Municipal Sewage Sludge June 1981. EPA 430/9-81-011	NTIS (address above)
4.	Financial Capability Guidebook April 1982.	Government Finance Research Center 1750 K St., NW Suite 650 Washington, D.C. 20006 (202) 466-2473
5.	Facilities Planning for Small Alternative Wastewater Treatment Systems	USEPA - WH595 401 M Street, SW Washington, D.C. 20460
6.	Flow Reduction Handbook. EPA, March 1981, FRD -15.	NTIS (address above)
7.	Generic Facilities Plan for a Small Community: Stabilization Pond and Oxidation Ditch. EPA 430/9-81-007 February 1981, FRD-18.	NTIS (address above) Ordering No. PB 81172710
8.	Handbook for Sewer System Evaluation and Rehabilitation, December 1975, EPA 430/9-75-021.	NTIS (address above)
9.	Innovative and Alternative Technology - Case Studies, January 1981, EPA 430/9-81-010.	NTIS (address above)

10. Manual of Practice - Sewer System Evaluation, Rehabilitation and New Construction, (EPA-600/2-77-017d).	NTIS (address above)
11. Management of Small Waste Flows. EPA 600/2-78-173, September 1980.	NTIS (address above) Ordering No. PB 286560
12. Municipal Pretreatment Program Guidance Package. September 1980.	USEPA - WH547 401 M Street, SW Washington, D.C. 20460
13. NPDES Compliance Evaluation Inspection Manual, January 1981	NTIS (address above)
14. Operation/Maintenance/Management Program Requirements and Guidance for the Construction Grants Program Fiscal Year 1982. (draft)	US EPA - WH 547 Municipal Operation Branch 401 M Street, SW Washington, D.C. 20460
15. Primer for Wastewater Treatment, July 1980	US EPA Instruction Resource Center 1200 Chambers Road Room 310 Columbus, Ohio 43212 (614) 422-6717
16. Process Design Manual for Onsite Systems. EPA 625/1-80-012, Wastewater Treatment and Disposal October 1980.	USEPA - CERI Cincinnati, Ohio 45268 Telephone (513) 684-7562
17. Process Design Manual for Land Treatment of Municipal Wastewater. EPA 625/1-81-013, October 1981	USEPA-CERI (address above)
18. Process Design Manual for Sludge Treatment and Disposal. EPA 625/1-79-011, September 1979.	NTIS (address above) Ordering number PB 80200546
19. Sludge Treatment and Disposal. EPA 625/4-78-012, 2 volumes, October 1978.	NTIS (address above) Volume 1 - "Sludge Treatment" Ordering number PB 299593/AS Volume 2 - "Sludge Disposal" Ordering number PB 299594/2BE

20. Uniform Appraisal Standards
for Federal Land Acquisition.

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
Telephone (202) 783-3238
Ordering number 052-059-000020

Other information is available from:

CAPDET Clearinghouse
Mississippi State University

EPA Small Wastewater Flows
Clearinghouse
West Virgina University
Morgantown, WV 26506 (800) 624-8301

Innovative and Alternative
Technology Clearinghouse
Municipal Research Laboratory
26 W. St. Clair
Cincinnati, OH 45268
(513) 684-7611

A Planning and Design Guidebook for Combined Sewer Overflow Control and Treatment.
September 1981 (DRAFT)

US EPA - CERI
(address above)

Combined Sewer Overflow Analysis Handbook
EPA 68-01-6148
July 1981 (DRAFT)

US EPA - (WH-595)
Policy and Guidance Branch
401 M Street, SW
Washington, DC 20460

Available from:

U.S. Dept. of Commerce
National Technical Information
Service (NTIS)
5285 Port Royal Road
Springfield, Virginia 22161
Call for prices: (703) 487-4650

or if asterisked (*):

U.S. EPA
Instruction Resource Center
1200 Chambers Road
Room 310
Columbus, Ohio 43212
(614) 422-6717

Municipal Construction Division Series (MCD)

☐ MCD-05 *Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability,* (EPA 430/99-74-010), July 1974.

☐ MCD-06 *Protection of Shellfish Waters,* (EPA 430/9-74-010), July 1974.

☐ MCD-10 Technical Report: *Costs of Wastewater Treatment by Land Application,* (EPA 430/9-75-003), revised September 1979.

☐ MCD-13 *Alternative Waste Management Techniques for Best Practicable Waste Treatment,* (EPA 430/9-75-013), October 1975.

☐ MCD-14 *Wastewater Treatment Ponds,* (EPA 430/9-74-011), March 1976.

☐ MCD-17 Technical Report: *Cost-Effective Comparison of Land Application and Advanced Wastewater Treatment,* (EPA 430/9-75-016), November 1975.

☐ MCD-20 Technical Report: *Direct Environmental Factors at Municipal Wastewater Treatment Works,* (EPA 430/9-76-003), January 1976.

☐ MCD-21 *Disinfection of Wastewater Task Force Report,* (EPA 430/9-75-012), March 1976.

☐ MCD-23 *Construction Inspection Guide,* printed in three volumes, (EPA 430/9-76-005), July 1976.

☐ MCD-26 *Environmental Changes From Long-Term Application of Sewage Effluent on Land,* (EPA 430/9-78-003), March 1978.

☐ MCD-27 *V E Formats and Case Studies,* (EPA 430/9-77-029). June 1977.

☐ MCD-28 *Municipal Sludge Management Environmental Factors,* (EPA 430/9-77-004), October 1977.

☐ MCD-29 *Value Engineering Workbook for Construction Grants Projects,* (EPA 430/9-76-008), July 1976.

☐ MCD-30 *Municipal Sludge Management: EPA Construction Grants Program, an Overview of the Sludge Management Situation,* (EPA 430/9-76-009), April 1976.

☐ MCD-32 *Energy Conservation in Municipal Wastewater Treatment,* (EPA 430/9-77-011), October 1977.

☐ MCD-33 *Application of Sewage Sludge to Cropland: Appraisal of Potential Hazards of the Heavy Metals to Plants and Animals,* (EPA 9-76-013), November 1976.

☐ MCD-34 * *Wastewater: Is Muskegon's Solution Your Solution?,* (EPA 905/2-76-004), September 1976.

☐ MCD-35 *Application of Sludges and Wastewater on Agricultural Land: A Planning and Educational Guide,* reprinted with permission of Ohio State University, March 1978.

☐ MCD-36 *Sludge Handling and Disposal Practices at Selected Municipal Wastewater Treatment Plants,* (EPA 430/9-77-007), April 1977.

☐ MCD-40 *A History of Land Application as a Treatment Alternative,* (EPA 430/9-79-012), April 1979.

☐ MCD-41 *An Approach for Comparing Health Risks of Wastewater Treatment Alternatives: A Limited Comparison of Health Risks Between Slow Rate Land Treatment and Activated Sludge Treatment and Discharge,* (EPA 430/9-79-009), September 1979.

☐ MCD-42 *Upgrading Trickling Filters,* (EPA 430/9-78-004), June 1978.

☐ MCD-43 *Federal Guidelines: State and Local Pretreatment Programs,* three volumes, (EPA 430/9-76-017a, b, c), January 1977.

☐ MCD-44 **Construction Grants Program Information—Industrial Cost Recovery Systems,* November 1976.

☐ MCD-53 *Innovative and Alternative Technology Assessment Manual,* (EPA 430/9-78-009), February 1980.

This manual has been designed to aid Federal and State review authorities in the administration of the innovative and alternative requirements of the Construction Grants Program as well as providing the same basic methodological information to the engineering and planning personnel preparing facilities plans.

☐ MCD-54 *Wastewater Stabilization Pond Linings,* (reprint of USA CRREL, SR 78-28), November 1978.

☐ MCD-60 *Energy Requirements for Small Flow Wastewater Treatment Systems,* (reprinted with permission of USA CRREL, SR 79-7), April 1979.

☐ MCD-61 *Evaluation of Sludge Management Systems: Evaluation Checklist and Supporting Commentary,* (EPA 430/9-80-001), October 1979.

☐MCD-62 *NPDES Compliance Biomonitoring Inspection Manual,* October 1979.

☐ MCD-66 *Assessment of Current Information on Overland Flow Treatment of Municipal Wastewater,* (EPA/9-80-002), May 1980.

☐ MCD-67 *Aquaculture Systems for Wastewater Treatment: Seminar Proceedings and Engineering Assessment,* (EPA 430/9-80-006), September 1979.

This publication contains an engineering assessment and the proceedings of a seminar held at the University of California-Davis on September 11-12, 1979, on the use of various aquaculture systems (wetland processes, aquatic processes) for the treatment of municipal wastewater.

☐ MCD-68 *Aquaculture Systems for Wastewater Treatment: An Engineering Assessment,* (EPA 430/9-80-007), June 1980.

This report contains the results of an engineering assessment of the current status of aquaculture technologies for wastewater treatment.

☐ MCD-69 *Recommendations from Value Engineering Studies in Wastewater Treatment Works,* (EPA 430/9-80-010), September 1980.

This publication summarizes the best ideas/recommendations from 93 value engineering (VE) reports which were completed under the EPA mandatory VE program.

☐ MCD-72 *A Guide to Regulations and Guidance for the Utilization and Disposal of Municipal Sludge,* (EPA 430/9-80-015), September 1980.

Management and Operation Series (MO)

The Municipal Construction Division, Office of Water Programs wishes to announce the availability of the following publications. This material, although widely distributed from the Municipal Operations Branch is considered timely and worthy of your consideration.

- ☐ MO-1 * *Estimating Staffing for Municipal Wastewater Treatment Facilities,* March 1973.
- ☐ MO-5 *Considerations for preparation of Operation and Maintenance Manuals,* (EPA 430/9-74-001).
- ☐ MO-7 * *Maintenance Management Systems for Municipal Wastewater Facilities,* (EPA 430/9-74-004), October 1973.
- ☐ MO-8 * *Start-up for Municipal Wastewater Treatment Facilities,* (EPA 430/9-74-008), December 1973.
- ☐ MO-9 * *Emergency Planning for Municipal Wastewater Treatment Facilities,* (EPA 430/9-74-013), February 1974.
- ☐ MO-10 * *Aspects of State-wide Emergency Response Programs for Municipal Wastewater Treatment Facilities,* (EPA 430/9-74-014), March 1974.
- ☐ MO-11 * *Anaerobic Sludge Digestion—Operations Manual,* (EPA 430/9-76-001), February 1976.
- ☐ MO-12 * *Package Treatment Plants—Operations Manual,* (EPA 430/9-77-005), April 1977.
- ☐ MO-14 * *Process Control Manual for Aerobic Biological Wastewater Treatment Facilities,* (EPA 430/9-77-006), March 1977.
- ☐ MO-15 *Operations Ponds Stabilization Manual,* (EPA 430/9-77-012), August 1977.
- ☐ MO-16 *Field Manual for Performance Evaluation and Troubleshooting at Municipal Wastewater Treatment Facilities,* (EPA 430/9-78-001), January 1978.
- ☐ MO-19 *Sludge Handling and Conditioning,* (EPA 430/9-78-002), February 1978.
- ☐ MO-21 * *Inspector's Guide for Evaluation of Municipal Wastewater Treatment Plants,* (EPA 430/9-79-010), April 1979.
- ☐ MO-22 *Management of Small-to-Medium Wastewater Treatment Plants,* (EPA 430/9-79-013), July 1979.
- ☐ MO-23 *A Planned Maintenance Management System for Municipal Wastewater Treatment Plant,* (EPA 600/2-73-004), November 1973.
- ☐ MO-24 *Evaluation of Flow Equalization in Municipal Wastewater Treatment,* (EPA 600/2-79-096), May 1979.
- ☐ MO-25 * *Chemical Aids Manual for Wastewater Treatment Facilities,* (EPA 430/9-79-018), December 1979.

Facility Requirements Series (FRD)

- ☐ FRD-8 *Proceedings—National Conference on Water Construction and Municipal Wastewater Flow Reduction,* November 28 & 29, 1978—Chicago, Ill. (EPA 430/9-79-015), August 1979.
- ☐ FRD-9 *Determining Wastewater Treatment Costs for Your Community,* October 1979.
- ☐ FRD-10 * *Small Wastewater Systems—Alternative Systems for Small Communities and Rural Areas,* January 1980. (foldout)
- ☐ FRD-11 *Construction Costs for Municipal Wastewater Treatment Plants: 1973-1978,* (EPA 430/9-80-003), April 1980.
- ☐ FRD-12 *The Alternative is Conservation.*

  This handbook demonstrates water conservation techniques and devices; copies of an accompanying film or video cassette are available for loan or purchase from the following address:

  User
  30 Bates Road
  Watertown, MA 02172
- ☐ FRD-19 *1978 Needs Survey—Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities,* (EPA 430/9-81-001), February 1980.

Appendix D

Fuel Cost Escalation Factors - Example Calculation

Town A, N.J. decided to build an 8 MGD activated sludge process plant. The following data are provided:

Capital Cost	$ 15,539,800
Interest during construction (@ 7 5/8% for 2 years)	1,184,900
Total investment cost	$ 16,724,700
Electricity	$200,000/yr.
Natural Gas	$150,000/yr. (mainly for sludge incineration)
Other O&M Costs	$700,000/yr.
Interest Rate	7 5/8 %
Planning Period	20 yrs.

All the costs are at average 1980 price levels. The procedure for present worth analysis follows:

1. From Table 1, the uniform present worth factors for energy cost escalation for electricity and natural gas for Town A, N.J. were obtained from Region II data; they are 10.99 and 12.19 respectively.

2. Present Worth Analysis:

Capital Cost	$16,724,700
Salvage Value (Assumed)	0
Other O&M Costs:	
$700,000 X 10.098 (PWF)[1]	$ 7,068,600
Electricity: $200,000 X 10.99	$ 2,198,000
Natural Gas: $150,000 X 12.19	$ 1,828,500
Total Present Worth Value	$27,819,800

[1] PWF = Present Worth Factor

TABLE 1

UNIFORM PRESENT WORTH DISCOUNT FACTORS ADJUSTED FOR ENERGY COST ESCALATION

(DISCOUNT RATE + 7-5/8%, PLANNING PERIOD = 20 YEARS AND NO INFLATION INCLUDED)

	Region I	Region II	Region III	Region IV	Region V	Region VI	Region VII	Region VIII	Region IX	Region X	National Average
Electricity	11.23	10.99	11.64	12.25	11.84	12.15	11.00	10.10	11.46	14.91	11.84
Distillate Oil	12.40	12.38	12.38	12.38	12.46	12.47	12.46	12.38	12.52	13.25	12.38
Residual Oil	12.30	12.30	12.30	12.42	12.38	12.43	12.43	12.37	12.49	12.61	12.37
Natural Gas (liquid)	12.79	12.79	12.70	14.47	12.70	12.79	12.76	12.70	12.79	12.79	12.79
Natural Gas	12.11	12.19	13.82	14.87	14.17	14.20	16.97	13.78	12.39	12.39	14.05
Coal	11.78	11.84	11.82	11.93	11.89	11.80	11.93	11.32	11.78	10.10	11.87

Sources used for compilation of this table:

1. DOE: EIA "Short-Term Energy Outlook", May 1980
2. DOE: EIA "Annual Report to Congress" DOE/EIA - 0173 (79-3). May 1979
3. DOE: EIA "Preliminary 1985, 1990 and 1995 Energy Forecast for the Annual Report to Congress, 1979" Service Report SR/IA/80-01, April 1980
4. Grant, E.L., W.G. Ireson and R.S. Levenworth: "Principles of Engineering Economy:, The Ronald Press Co., N.Y 6th Edition, 1976

APPENDIX E

PRESENT WORTH AND COST PREFERENCE EXAMPLES

Example 1: Varying O&M Cost, Staged Construction, and Salvage Value

Given:

sewage treatment plant
capacity: year 1-10, 5 mgd; years 11-20, 10 mgd;
average flow through plant: increase linearly from 2 mgd to 10 mgd over 20 years;
planning period: 20 years;
salvage value at end of 20 years: $750,000;
capital cost of plant (5 mgd): $2,000,000;
future capital cost at year 10 to expand to 10 mgd: $1,500,000;
O&M costs:

a. constant annual O&M cost, years 1-10: $84,000;

b. variable annual O&M cost, years 1-10; increases linearly from $0-$29,000 in year 10;

c. constant annual O&M cost, years 11-20: $165,000;

d. variable annual O&M cost, years 11-20: increases linearly from $0-$29,000 in year 20.

discount rate: 7 5/8 %.

Determine: Present worth and annual equivalent uniform cost of plant over 20 years.

Method: Present worth equals capital cost plus present worth of the operating and maintenance costs. Calculate O&M costs from year 10 and O&M costs for 11 years 11 through 20 separately. Also add present worth of expansion and subtract present worth of salvage value from present worth of other costs. Equivalent uniform annual costs equals the present worth times the appropriate capital recovery factor.

Step 1:

Initial capital cost $2,000,000

Step 2:

Present worth of expansion cost which occurs at year 10, times single payment present worth factor @ 7 5/8% for 10 years. Thus:

$1,500,000 (.480) . . . . $ 719,400

Example 1: Varying O&M Costs, Etc. (continued)

Step 3:

Calculate present worth of O&M costs as follows:

a. Present worth of constant annual cost years 1-10 equals given cost times uniform series present worth factors @ 7 5/8% for 10 years. Thus:

   $84,000 (6.825). . . . . $ 573,300

b. Present worth of variable O&M costs years 1-10 equals gradient series ($2,900) times present worth factor of a gradient series @ 7 5/8% for 10 years. Thus:

   $2,900 (26.612). . . . . $ 77,200

c. Present worth of constant O&M costs year 11-20 are first calculated as in (a) above using given cost for years 11-20. This, however, yields present worth in year 11 which must be converted to present worth in year 1. This is accomplished by multiplying present worth (year 11) times single payment present worth factor @ 7 5/8% for 10 years (.480). Thus, present worth in year 1 equals:

   $165,000 (6.825)(.480). . . . . $ 540,100

d. Present worth of variable O&M costs years 11-20 are first calculated as in (b) above using gradient series for years 11-20 which is $2,900. This yields present worth in year 11 which again must be converted to present worth in year 1 by multiplying present worth (year 11) times single payment present worth factor 7 5/8% for 10 years (.480). Thus:

   $2,900 (26.612)(.480) . . . . $ 37,000

Step 4:

Present worth of salvage value at end of 20 years equals that value times single payment present worth factor @ 7 5/8% for 20 years. Thus:

$750,000 (.230) . . . . $ 172,500

Step 5:

The sums of values obtained in steps 1, 2, and 3 minus value obtained in step 4 equals present worth of plant. Thus:

initial capital cost $2,000,000
present worth of expansion at year 10. . . . $ 719,400
present worth of constant O&M years 1-10 . . . . $ 573,300

Example 1: Varying O&M Costs, Etc. (continued)

present worth of variable O&M years 1-10	$ 77,200
present worth of constant O&M years 11-20	$ 540,100
present worth of variable O&M years 11-20	$ 37,000
Total	$3,947,000

Subtract from total the present worth of salvage value:

present worth of salvage value	$ 172,500
PRESENT WORTH of plant	$3,774,500

Step 6:

Multiply present worth of plant 5 times the capital recovery factor @ 7 5/8% for 20 years will yield equivalent uniform annual equivalent cost. Thus:

$3,774,500 (.099)	$ 373,700

Example 2: Present Worth Analysis of Onsite System Alternative

Given:

individual onsite treatment systems consisting of:

a. rehabilitation, upgrading or replacement of onsite systems for 200 existing homes;
b. major rehabilitation of 10 onsite systems per year;
c. construction of 100 onsite systems for new homes.

planning period: 20 years
salvage value at end of 20 years: $120,000
capital costs:

a. rehabilitation, upgrading, replacement of 200 existing systems: $400,000
b. rehabilitation of 10 systems per year: $20,000 per year*
c. construction of 100 new systems (5 per year for 20 years): $13,000 per year*

average annual operation and maintenance cost (onsite management program for 500 systems): $25,000 per year
discount rate: 7-5/8 percent

Determine: Present worth and equivalent uniform annual cost over 20 years.

Method: Present worth equals initial capital cost plus present worth of future capital costs plus present worth of operation and maintenance costs. Subtract present worth of salvage value. Equivalent uniform annual cost equals the present worth times the appropriate capital recovery factor.

Step 1:

Initial capital cost $400,000

Step 2:

Calculate present worth of annual capital costs as follows:

a. annual capital costs equal $20,000 per year plus $13,000 per year equals $33,000 per year.
b. present worth of annual capital cost equals given cost times the uniform series present worth factor at 7-5/8% for 20 years. Thus:

$33,000 (10.098) $333,200

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*Not eligible for EPA grant funding

Example 2: Present Worth Analysis of OnSite System (continued)

Step 3:

Present worth of annual O&M cost equals annual O&M costs times the uniform series present worth factor at 7 5/8 percent for 20 years. Thus:

$25,000 (10.098)............................$252,500

Step 4:

Present worth of salvage value at end of 20 years equals that value times the single payment present worth factor at 7 5/8 percent for 20 years. Thus:

$120,000 (0.2300)...........................$ 27,600

Step 5:

The sums of values obtained in Steps 1, 2, and 3 minus the value obtained in Step 4 equal present worth of alternative. Thus:

initial capital cost.............................	$400,000
present worth of future capital costs............	333,200
present worth of O&M.............................	252,500
Total..	$985,200
Subtract from total the present worth of salvage value: present worth salvage value..........	27,600
PRESENT WORTH of alternative....................	$958,100

Step 6:

The present worth just derived times the capital recovery factor at 7 5/8 percent for 20 years will yield average annual equivalent cost. Thus:

$958,100 (0.099)......................... $ 94,900

Note:

When comparing conventional systems with alternative systems all costs, eligible and ineligible, must be considered, including service lines and hookup fees.

Example 3: Land Application

Given:

sewage treatment plant
capacity: 4.0 mgd
planning period: 20 years
capital cost: $7,300,000 including land cost of $137,000
average annual operation and maintenance cost: $246,200
average annual crop yield $20,000
discount rate: 7-5/8 percent
salvage value excluding land: $2,236,000

Determine: Present worth over 20 years.

Method: Present worth equals the sum of capital cost plus present worth of the annual O/M minus the present worth of the average annual crop yield minus the present worth of the salvage value (Note: Land values must be appreciated at 3 percent/year before a salvage value is computed).

Step 1:

Capital cost.................................... $7,300,000

Step 2:

Present worth of an annual cost equals annual cost times the uniform series present worth factor @ 7 5/8 for 20 years. The present worth of crop production is subtracted from the present worth of O/M to give the present worth of annual costs for the system.

O/M: $246,200 (10.098)	$2,486,100
Crops: 80,000 (10.098)	$ 807,800
PRESENT WORTH of annual costs	$1,678,300

Step 3:

Compute the future value for the land by multiplying the present value of land by the compound amount factor @ 3 percent for 20 years

Future value: $137,000 (1.806).................. $ 247,400

Step 4:

Compute the total present worth of the salvage value by multiplying the value at the end of 20 years times the single payment present worth factor @ 7 5/8 percent for 20 years. Thus:

Land: $247,400 (.230)	$ 56,900
Treatment plant 2,236,000 (.230)	$514,300
Total	$571,200

Example 3: Land Application (continued)

Step 5:

The sum of the value obtained in Step 1 and 2 minus the value obtained in Step 4 equals present worth of the plant. Thus:

Initial capital cost.............................	$7,300,000
Present worth of annual costs...................	$1,678,300
Total...	$8,978,300
Subtract from total the present worth of salvage value: present worth of salvage value.........	$ 571,200
PRESENT WORTH of plant..........................	$8,407,100

Note: If the land used for land application is purchased or leased by the municipality, the land is considered a cost to the project and therefore does enter into the present worth analysis. If a sharecropping arrangement exists between the municipality and the farmer, only the profits/losses realized by the municipality are used in the present worth analysis (section 7.0).

EXAMPLE 4. Application of I&A Cost Preference

Given:

A proposed project includes portions which are classified as alternative technology. The components which are considered alternative technology are the primary and secondary processes (pretreatment and land application) but sludge disposal is conventional technology (sanitary landfill).

The present worth costs of the proposed system and the most cost-effective conventional system are shown below.

	Most Cost-Effective Conventional System		Proposed Alternative Technology System	
	Capital Cost	Present Worth *	Capital Cost	Present Worth *
Primary	$ 100	$ 110	$ 31	$ 35
Secondary	720	753	830	905
Sludge Disposal	873	971	873	971
Total	$1,693	$1,834	$1,734	$1,911

* Includes O&M

Determine: Whether the alternative technology system is cost effective by application of cost-preference procedures described in Section 7.0.3.

a. $971 (total present worth of conventional component of alternative technology system)

b. $\frac{\$\ 971}{\$1,911}$ = 51% (percentage of total present worth represented by conventional components; Note: more than 50%)

c. (1) $110 + $753 = $863 (present worth of replaced components in the most cost-effective conventional system)

(2) $863 (1.15) = $992.45 (application of cost preference multiplier)

(3) $992.45 + $971 = $1,963 (determination of cost ceiling)

Result: $1,911 is less than $1,963; therefore, proposed alternative technology system is considered cost effective and may be selected by grantee.

GRANT CALCULATION:

Capital costs of Alternative technology components (85% grant) $31 + $830 = $861 (.85)	$ 731.85
Capital Costs of conventional components (75% grant) $873 (.75)	$ 654.75
Total Grant	$1,386.60

APPENDIX F

COST ADJUSTMENT FOR FINANCIAL CAPABILITY

Annual Median Household Income (AMHI)

Median income data should be from local sources if available. Otherwise, 1969 median family income data is available for all counties and many cities from the Bureau of the Census, 1970 Census. Data for most States will be available from the 1980 Census in mid 1982. Until then, HUD data for median family income in Standard Metropolitan Statistical Areas (SMSA's) and non-SMSA portions of States can be used. Note that family income is not the same as household income. Household income is approximately 0.854 times family income. (Also, per capita income multiplied by family or household size does not equal median income.)

Consumer Price Index (CPI)

a. Select the CPI from the table below for the year for which AMHI is known.

b. Divide the CPI for 1980 (246.8) by the CPI selected in "a."

c. Multiply the known AMHI by the number obtained in "b."

d. The result is the AMHI in 1980 dollars and is the number used in determining if a project is considered expensive (Section 7.2).

Consumer Price Index

Year	CPI	Year	CPI	Year	CPI
1969	109.8	1974	147.7	1979	217.4
1970	116.3	1975	161.2	1980	246.8
1971	121.3	1976	170.5	1981	272.4
1972	123.3	1977	181.5		
1973	133.1	1978	195.4		

APPENDIX G

Supplemental Information for Land Acquisition

Applicable Regulations:

Any land acquired in conjunction with federally funded projects is subject to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646). EPA regulations implementing P.L. 91-646 are found in 40 CFR Part 4. All appraisals setting the fair market value of land to be acquired must be in conformance with "Uniform Appraisal Standards for Federal Land Acquisition" prepared by the Interagency Land Acquisition Conference and available through the Government Printing Office (GPO Stock Number 052-059-00002-01).

The Regional Administrator must approve the price the grantee will offer the property owner for real property determined allowable for grant assistance (40 CFR, Part 35). The title to real property acquired with Federal grant assistance must reflect the governments interest (40 CFR, Part 30).

Professional Land Acquisition Staff:

It is most advisable to have all land acquisition carried out by acquisition professionals with experience in working with the Federal requirements and eminent domain procedures. If the grantee does not have access to a professional land acquisition staff with experience in working with P.L. 91-646, arrangements should be made to consult or contract with outside professionals.

The Federal Highway Administration has right-of-way offices in each State's capital city and their staff can provide an overview of acquisition expertise within the State, including State professionals and independent contractors as well as advice on a land acquisition plan. Each State has department of transportation or right-of-way offices located in the capital city. Most of these State offices can provide acquisition assistance to communities and local agencies and will usually contract for all or part of the acquisition responsibility. Some States have other professional staff available, such as State parks or State general services administrations. Some counties or nearby cities may also be able to provide professional assistance. Most Federal and State offices have lists of qualified appraisers whom they employ when they require additional appraisals for their projects.

Appraisals:

The grantees should make every effort to ensure that the appraiser has sufficient knowledge and experience in the type of appraisal problem to be solved and is thoroughly familiar with local conditions and property values. It is necessary to check credentials and experience of independent professionals thoroughly. The use of city, county, State or Federal staff has the advantage that they have met the requirements of their job descriptions which increases the probability of getting qualified professionals.

There are professional appraisal organizations which sponsor training, publish guidance and information, require proof of attainment of expertise for certification or professional designation in the organization and monitor work performed by their members. Appraisers who are certified or designated members of these organizations are required to follow the organization's Code of Ethics and are subject to disciplinary actions and dismissal for failure to perform according to the standards of the organization. A list of appraisers for a given area can be obtained from the headquarters offices of each appraisal organization:

American Institute of Real Estate Appraisers
400 N. Michigan Avenue
Chicago, Illinois 60611

American Society of Appraisers
P.O. Box 17265
Washington, D.C. 20041

American Society of Farm Managers and
Rural Appraisers
P.O. Box 6857
Denver, Colorado 80206

National Association of Independent Fee
Appraisers
7501 Murdoch
St. Louis, Missouri 63119

Society of Real Estate Appraisers
645 North Michigan Avenue
Chicago, Illinois 60611

Additionally, EPA headquarters staff can provide information and recommendations concerning appraisers. Call Barbara Greenlee, 202/755-8056.

It is most desirable to select knowledgeable local appraisers who hold memberships in one or more of these organizations and can demonstrate expertise in the type of appraisal to be performed.

Appraisal Review:

If the grantee does not employ or affiliate with an agency that employs qualified review appraisers on its staff, some other means of appraisal review by appropriately qualified individuals should be found. Various methods such as the use of independent fee appraisers (members of professional appraisal organizations) or qualified appraisal review personnel from county, State or Federal agencies could be used. If the estimated fair market value of the land to be acquired is greater than $100,000, two appraisals should be obtained. The reviewer would approve one of the appraisals or request additional appraisals.

Negotiation:

There should be no negotiation with the landowner prior to the establishment of fair market value by appraisal and review and approval of the price to be offered by the Regional Administrator. Some limited or modest increase above the approved appraised value may be paid to avoid the cost, time, and public relations problems involved with condemnation if approved by the Regional Administrator. However, the grantee should be prepared to initiate eminent domain proceedings if the required land cannot readily be acquired for a reasonable price.

Options:

Options may be used to tie up land if purchase money is not readily available. Land can be optioned or purchased as soon as all environmental documents have been approved and the site has been determined to be suitable. However, approval must be obtained from the regional administrator to acquire grant eligible land prior to Step 3 award. A satisfactory argument for early purchase can usually be based on an anticipated increase in land cost and on difficulty in obtaining assurances that the land will remain available.

Eminent Domain:

The grantee should determine whether it has eminent domain authority before proceeding with an alternative requiring land acquisition. The State attorney general's (AG) office can be consulted for this determination and may handle any required action.

The AG can also advise on time required to complete any condemnation action, whether the State has quick-take enabling legislation, whether the magnitude of the project or other considerations indicate that project-specific quick-take legislation should be considered and how complicated these procedures would be.

Relocation:

Title II, Uniform Relocation Assistance, of P.L. 91-646 contains specific provisions regarding the Federal share for moving and related expenses, replacement housing payments and relocation assistance advisory services. This Act applies if an owner, tenant or business is to be relocated as a result of real property acquisition. The Federal and State offices previously discussed work with relocation under this Act and can provide necessary guidance. Relocation eligibility and payments should be determined by or in consultation with experienced relocation personnel.

Alternatives to Acquisition:

It is advisable to explore leasing or other arrangements for land application as alternatives to fee simple acquisition. Some farmers may be willing to take effluent or sludge at a nominal cost or no cost or even provide payment for wastewater.

Site Selection:

It is essential to complete all studies required to establish the suitability of the contemplated site before any acquisition actions are taken. If condemnation is anticipated, a court order may be required to complete these studies. If the city's attorney is not familiar with condemnation procedures, the State attorney general's office can usually provide advice or handle any required action.

Records:

Grantees should maintain all of the requisite land acquisition background information and documents in a readily accessable form.

APPENDIX H

PROCEDURE FOR THE ELIMINATION OR MINIMIZATION OF EXPLOSION RELATED PROBLEMS

The following guidance contains good engineering practices. Since it is not the intent of this guidance to modify or replace any appropriate safety requirements and regulations published by the Occupational Safety and Health Administration (OSHA) or the National Fire Protection Association (NFPA), it is recommended that the guidelines be used to supplement these and other appropriate safety requirements and codes.

I. Classification of Wet Wells and Dry Wells for Sewage Lift Stations

A. Wet wells and dry wells for sewage lift stations should be classified in accordance with article 500 of the National Electric Code (NEC)* as found in NFPA publication 70. Classification is based principally on whether a flammable mixture may be present: (a) under normal operating conditions; or (b) only under abnormal operating conditions or equipment breakdown (including lifting of submersible equipment for inspection, maintenance or repair). The classification of wet wells and dry wells for sewage lift stations must be site specific and established by investigation of the conditions for each installation.

1. Wet Wells: Wet wells should be classified on a case-by-case basis depending on design, type, and intended use. Guidance for classification of wet wells is presented in Figure I. The following definitions can be used in classifying wet wells:

(a) Wet Well: A wet well is a below ground structure designed to accept and temporarily store wastewater for the purpose of pumping. A wet well may or may not contain electrical equipment such as pumps, motors, wiring and wiring devices, controls, light and other accessories.

(b) High Hazard Wet Well: A wet well which can be expected to receive significant inflow of flammable liquids including all wet wells serving combined sewer systems or serving separate sewer systems that receive flow from industrial sources or those commercial sources such as paint or hardware stores which regularly handle large quantities of volatile flammable liquids.

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*All references to NEC found in this guidance means publication No. 70 - 1981 edition of the National Fire Protection Association (NFPA)

(c) Low Hazard Wet Well: A wet well not reasonably expected to receive significant inflow of flammable liquids. This includes wet wells serving separated sewer systems for primarily residential sources and/or those commercial sources not handling large quantities of volatile flammable liquids.

(d) Closed Wet Well: A wet well lacking natural or mechanical ventilation as defined below.

(e) Naturally Ventilated Wet Well: A wet well built with at least one ventilator designed to effectively utilize wind pressure and/or thermal convection to remove gas from the wet well.

(f) Mechanically Ventilated Wet Well: A wet well equipped with continuously or intermittent (time clock) operating mechanical ventilation (totally isolated from the dry well ventilation) providing at least 10 air changes per hour and equipped with failure alarm. Intermittent operations must have a minimum of four (4) operations per hour.

FIGURE I

WET WELL CLASSIFICATION

TYPE	WITHOUT VENTILATION*	NATURAL VENTILATION	MECHANICAL VENTILATION
High Hazard Wet Well	Class 1 - Division 1 group D	Class 1 - Division 1 group D	Class 1 - Division 2 group D
Low Hazard	Class 1 - Division 1 group D	Class 1 - Division 2 group D	Class 1 - Division 2 group D

* Not permitted in most States

2. All electrical equipment in the wet well should comply with Article 501 of the NEC for Class 1 - Division 1 or 2 locations as shown in Figure I. This includes pumps, motors, controls and control wiring, lights, power wiring and wiring devices and other accessories.

3. Submersible equipment used in wet well classified as Division 1 should be either explosion-proof or meet one of the four (4) conditions of Article 501-8(a) of the NEC. "Guaranteed Submergence" as interpreted, by EPA, from paragraph (4) of this Article means that under normal operating conditions the pumping equipment is a minimum of 6 inches below low water level at all times when the pump is operating. Double low water cut off switches should be used to provide additional safety in case of level switch failure. When "guaranteed submergence" is used, sensors to automatically de-energize the equipment when liquids falls below a set level should be used. Lost of submergence should, in addition to de-energizing the motor, generate an alarm similar to that used for high water level. The motor can be re-energized automatically when submergence is regained, but the alarm should require manual reset. When "guaranteed submergence" is used in place of explosion-proof, the pump should have double or tandem mechanical seals with outboard seal failure detectors and the motors with terminal board connections which are isolated from the motor windings by a separate O-ring gasketed chamber. The motor should also have thermal sensors that limit the motor winding temperature in accordance with Section 500-2(b) of the NEC Code.

Additional maintenance may be required for installation utilizing "guaranteed submergence" because of solids accumulation which may occur in these wet wells. O&M manuals should address any additional requirements or procedures.

4. When oil filled submersible motors are used in Division 1 or 2 locations they should be equipped with thermal detectors designed to de-energize the equipment before internal motor temperature reach ignition levels. Over temperature should also generate an alarm similar to that used for high water level. The motor can be re-energized automatically when cooled, but the alarm should require manual reset.

5. Submersible equipment used in wet wells classified as Division 2 may be, but are not required to be explosion-proof. Motors may be squirrel cage induction motors which have no brushes, switching mechanisms or similar arc producing devices as described in Article 501-8(b) of the NEC code.

6. Flexible cords may be permitted in Division 1 or 2 locations for submersible pumping equipment designed for quick removal. The flexible cords should be classified for use with portable utilization equipment and should meet all the requirements of Article 501-11 of the NEC.

Flexible cords used with submersible pumps should be approved for extra-hard usage and shall have an oil resident outer jacket.

7. Grinder pumps, septic tank effluent pumps and other residential pumping units associated with onsite wastewater treatment or used to convey wastewater from individual dwelling units or clusters are exempt from these requirements and are not covered by this guidance.

8. Non-sparking pumps and guide rail systems for submersable equipment are not required for Division 1 or 2 locations. When non-sparking guide rails systems are not used however, special precaution may be required during abnormal operating conditions. Wet well atmospheres should be tested for explosive mixtures and forced air ventilated, if necessary, before the pumping equipment is raised for inspection, maintenance or repair. Any wet well alarm signal should alert operating personnel of possible hazardous gas conditions.

9. All wet wells classified as Division 1 locations should be marked "Danger-Hazardous Gases". Operations and maintenance manuals should indicate all wet well classified as Division 1 locations and should outline necessary normal and abnormal operating procedures.

B. Dry Wells: Dry wells should be classified on a case-by-case basis depending on design, type and intended use. In general dry wells may be classified one class lower than the associated wet well. Guidance for classification of dry wells is presented in Figure II.

1. The following definitions shall be used in classifying dry wells:

   (a) Dry Wells: A dry well is an above or below ground structure designed to house personnel, controls or equipment associated with pumping of wastewater. The dry well should have no openings such as hatches or odors, (except with gas tight seals or gaskets), unpacked pipe sleeves, untrapped drain pipes (unless equipped with ball valves or other dry environment or seal device) etc., by which vapor might be conveyed from the wet well. Dry wells should have no open surfaces of wastewater except such channels and sumps as are necessary to efficiently remove seal leakage, condensation and building drainage. A dry well may or may not contain electrical equipment such as pumps, motors, wiring, controls lights and associated wiring devices and other accessories.

(b) High Hazard Dry Well: A drywell pumping water from a high hazard wet well using pumps not equipped with fresh water seal purging.

(c) Low Hazard Dry Well: Any drywell pumping from a low hazard wet well or a dry well pumping from a high hazard wet well using pumps equipped with fresh water flushing of shaft packings or seals.

(d) Closed Dry Well: A dry well lacking natural or mechanical ventilation as defined below.

(e) Naturally Ventilated Dry Well: A dry well built with at least two widely separated ventilators designed to effectively utilize wind pressure and/or thermal convection to move air through the dry well.

(f) Mechanically Ventilated Dry Well: A dry well equipped with continuously or intermittent (time clock) operating mechanical ventilation (totally isolated from the wet well ventilation) providing at least 5 air changes per hour and equipped with failure alarm similar to that provided for wet well high level alarm. Intermittent ventilator operations must have a minimum of four (4) operations per hour. The dry well must also have adequate drainage or sump pumping to remove the maximum expected leakage from the failure of the shaft seal or packing of any one pump.

FIGURE II

DRY WELL CLASSIFICATION

	WITHOUT VENTILATION*	NATURAL VENTILATION	MECHANIC VENTILATION
High Hazard Dry Well	Class 1 - Division 1 group D	Class 1 - Division 2 group D	Unclassified
Low Hazard Dry Well	Class 1 - Division 1 group D	Unclassified	Unclassified

* Not Permitted in Most States.

Note: All dry well ventilation must comply with all OSHA requirements and all building and safety codes for personnel occupied working areas.

2. All electrical equipment in dry wells should comply with Article 501 of the NEC for Class 1 - Division 1, Division 2, or unclassified locations as shown in Figure II. This includes pumps, motors, controls and control wiring, lights, power wiring and wiring devices and other accessories.

3. Pumping equipment used in dry wells classified as Division 1 should be either explosion-proof or meet one of the four (4) conditions of Article 501-8(a) of the NEC.

4. Pumping equipment used in dry wells classified as Division 2 may be, but is not required to be explosion proof. Motors may be open enclosed motors, such as squirrel-cage induction motors without brushes, switching mechanisms or similar are producing devices in accordance with Article 501-8(b) of the NEC. Other types of motors and controls may also be used in Division 2 locations as also described in this article.

5. Flexible cords should not be used in dry wells classified as Division 1 or Division 2 except as specified by the NEC.

6. Non-sparking pumps and accessories may be used, but are not required for Division 1 or Division 2 dry wells.

7. In case of dry well ventilator failure alarm, the atmospheres should be tested for explosive mixture before entering the dry well and/or before any electrical equipment including non-explosion proof lights are energized. Continuous/volatile hydrocarbon analysers are recommended for all dry wells.

8. O&M manuals should indicate all dry wells classified as Division 1 locations and should outline necessary normal and abnormal operating procedures.

C. Explosion-Proof Equipment: Explosion-proof equipment means any equipment acceptable under the following conditions:

1. If it is accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory, such as, but not limited to, Underwriters' Laboratories, Inc., and Factory Mutual Engineering Corporation, or

2. With respect to an installation or equipment of a kind which no nationally recognized testing laboratory accepts, certifies, lists, labels or determines to be safe, if it is inspected or tested by a Federal agency, or by a State, municipal, or other local authority responsible for enforcing occupational safety provisions of the NEC, or

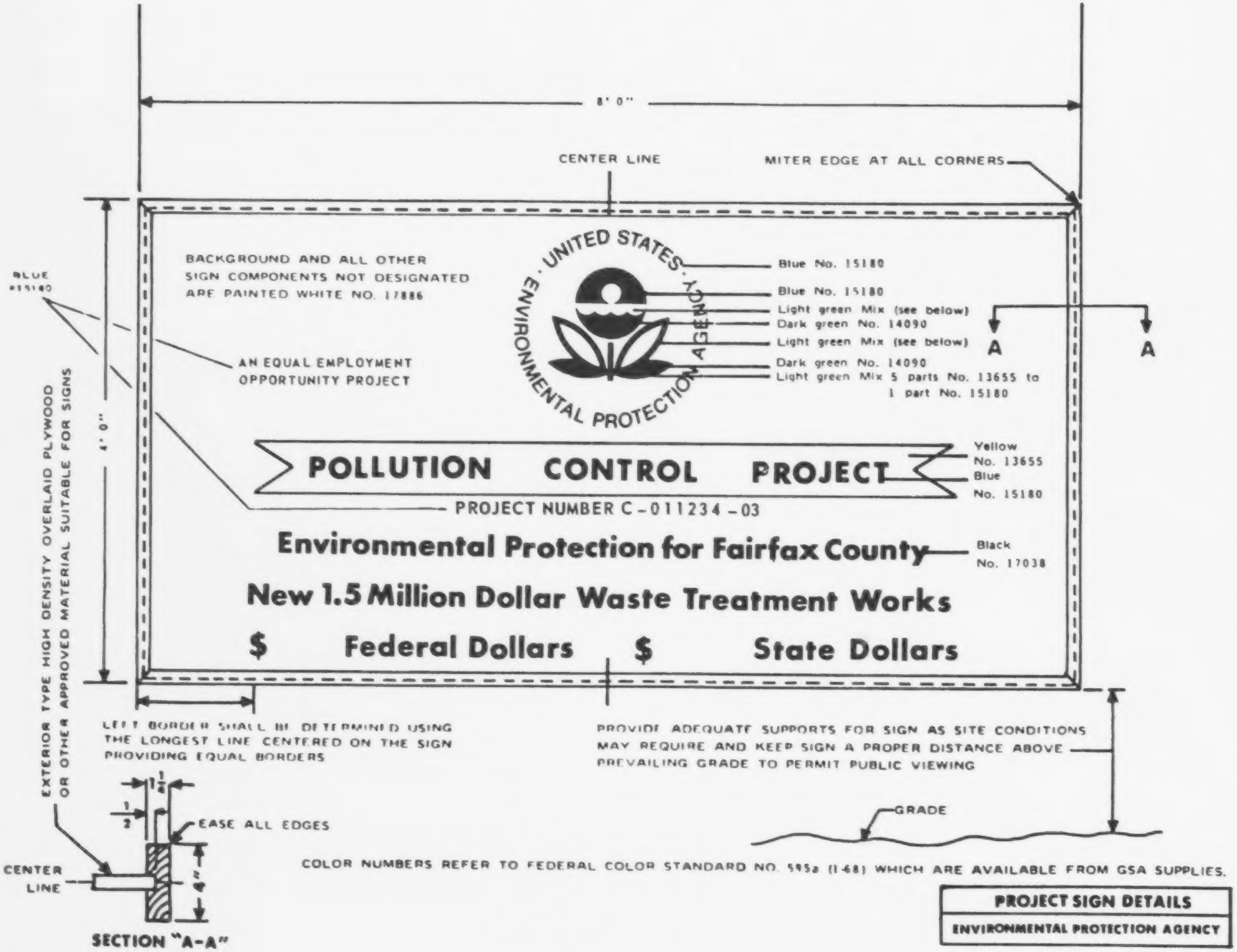
3. With respect to custom-made equipment or related installations which are designed, fabricated for, and intended for use by, a particular customer, if it is determined to be safe for its intended use by its manufacturer on the basis of test data which the employer keeps and makes available for inspection to Federal, State an/or local authorities.

II. Classification For Other Pumping Equipment Installations

In general, pumping equipment and all other electrical devices installed in other areas of a wastewater treatment plant should be reviewed during the design phase in order to determine if any explosion hazards may exist. It is the responsibility of the designer to evaluate these spaces under the rules outlined in NFPA documents 70, 70C and 497 and API document RP500A for electrical equipment classification. Pumping installations where explosion hazards may exist and that can not be eliminated, should be equipped with continuous/volatile hydrocarbon analysers with appropriate alarms.

III. Explosion Hazards From Volatile Compounds

All sewer use ordinance should include a clause that prohibits the discharge of volatile compounds that may cause explosion hazards. Experience has demonstrated, however, that in spite of sewer use ordinances, illegal discharges or accidental spills occur. Therefore, specific contingency plans are encouraged for all pumping stations serving sewer systems where volatile compounds may be discharged accidentally or illegally.


8' 0"
CENTER LINE
MITER EDGE AT ALL CORNERS
BLUE #15180
BACKGROUND AND ALL OTHER SIGN COMPONENTS NOT DESIGNATED ARE PAINTED WHITE NO. 17886
AN EQUAL EMPLOYMENT OPPORTUNITY PROJECT
UNITED STATES · ENVIRONMENTAL PROTECTION AGENCY ·
Blue No. 15180
Blue No. 15180
Light green Mix (see below)
Dark green No. 14090
Light green Mix (see below)
Dark green No. 14090
Light green Mix 5 parts No. 13655 to 1 part No. 15180
A
A
4' 0"
POLLUTION CONTROL PROJECT
Yellow No. 13655
Blue No. 15180
PROJECT NUMBER C-011234-03
Environmental Protection for Fairfax County
Black No. 17038
New 1.5 Million Dollar Waste Treatment Works
$ Federal Dollars $ State Dollars
EXTERIOR TYPE HIGH DENSITY OVERLAID PLYWOOD OR OTHER APPROVED MATERIAL SUITABLE FOR SIGNS
LEFT BORDER SHALL BE DETERMINED USING THE LONGEST LINE CENTERED ON THE SIGN PROVIDING EQUAL BORDERS
PROVIDE ADEQUATE SUPPORTS FOR SIGN AS SITE CONDITIONS MAY REQUIRE AND KEEP SIGN A PROPER DISTANCE ABOVE PREVAILING GRADE TO PERMIT PUBLIC VIEWING
GRADE
1 1/4
1/2
EASE ALL EDGES
4"
CENTER LINE
SECTION "A-A"
COLOR NUMBERS REFER TO FEDERAL COLOR STANDARD NO. 595a (1-68) WHICH ARE AVAILABLE FROM GSA SUPPLIES.
PROJECT SIGN DETAILS
ENVIRONMENTAL PROTECTION AGENCY

APPENDIX K

Wastewater Facilities Financial Information Sheet

Applicant

Name____

Address______________________________________

City__________________________ Zip___________

Contact______________________

Telephone ___________

Instructions for completing the Financial Information Sheet can be found in the Financial Capability Guidebook, which is available from the Government Finance Research Center, 1750 K St., N.W., Suite 650, Washington, D.C. 202/466-2494.

What Is Proposed In The Facilities Plan?

- The proposed facilities will be: (check more than one if applicable) ☐ New ☐ An expansion ☐ An upgrade

- If treatment facilities are proposed, do they feature low O + M Cost Technology such as ponds, trickling filters, overland flow? If yes, please identify. ☐ Yes ☐ No

____

____

____

- The facilities will benefit: ☐ Population on sewers ☐ Anticipated growth ☐ Area served by on-site systems

Indicate the appropriate percentage of the plant's capacity that will be devoted to each group. _______% _______% _______%

• Entities to be served:		☐ County	☐ Municipality	☐ Sewer district	☐ Industry
Flow contributions from each entity:	1st year	_______%	_______%	_______%	_______%
	5th year	_______%	_______%	_______%	_______%

- Design population ________ (Year ______________)

Wastewater Facilities Financial Information Sheet

What Roles And Responsibilities Will Local Governments Have?

Cooperative arrangements between various entities may be required to meet the management needs of wastewater treatment facilities.

				from line
• What agency will:	☐ Own the facilities	☐ Operate	☐ Finance	(101)
• Will there be financial contributions by:	☐ Other agencies	☐ Industry		(103)
• Have participating agencies been asked to review:	☐ Wastewater facilities plan	☐ Population projections	☐ Service area boundaries	(105)
• Have agreements been sought between the operating agency and:	☐ Participating agencies	☐ Other agencies	☐ Industy	(107)

How Much Will The Facilities Cost At Today's Prices?

The following figures are estimated costs for construction, operation, and maintenance of the proposed facilities. Dollar amounts are uninflated and reflect today's prices.

A. Construction costs estimate

		from line
• Wastewater treatment plant		(201)
• Pump stations		(202)
• Interceptor sewers		(203)
• Collection sewers		(204)
• On-site systems		(205)
• Land acquisition		(206)
• Other		(207)
• Total construction costs		(208)

B. Estimated annual operation, maintenance, and replacement (O + M + R) costs for the proposed facilities

			from line
• Labor		per year	(209)
• Utilities		per year	(210)
• Materials		per year	(211)
• Outside services		per year	(212)
• Misc. expenses		per year	(213)
• Equipment replacement		per year	(214)
• Total operation, maintenance and replacement costs		per year	(215)

How Will The Facilities Be Financed?

A. Amount to be borrowed

		from line
• Grantee share of construction costs		(309)
• Construction-related costs		(315)
• Grantee contributions		(320)
• Amount to be borrowed		(321)

B. Methods of financing the amount to be borrowed

Financing method	Amount borrowed	Interest rate	Term of maturity	Annual debt service payment	from line
General obligation bond					(322)
Revenue bond					(323)
Loan					(324)
Total		▨	▨		(325)

C. Total estimated annual wastewater facilities costs

		from line
• Net existing O + M + R		(328)
• Existing annual debt service		(329)
• O + M + R for proposed facilities		(330)
• Debt service for proposed facilities		(331)
• Total estimated annual wastewater facilities costs		(332)

D. Sources of funding for total annual wastewater facilities costs

		from line
• Sewer service charges		(333)
• Surcharge		(334)
• Special assessments and fees		
— connection fee		(335)
— betterment assessments		(336)
— other		(337)
• Transfers from other funds		(338)
• Other		(339)
• Total funding		(340)

Wastewater Facilities Financial Information Sheet

What Are The Annual Costs Per Household?

from line

- Total estimated annual wastewater facilities charges ________ (400)
- Nonresidential share of total annual charges ________ (401)
- Residential share of total annual charges ________ (402)
- Number of households ________ (403)
- Annual costs per household for
  - — wastewater collection and treatment ________ (404)
  - — other ________ (405)

from line

- Total annual costs per household ________ (406)
- Median household income ________ (407)
- Total annual costs per household as a % of median household income ________ (408)

Can Your Community Afford The Proposed Wastewater Treatment Facilities?

The financial capability of a community is the measure of its existing financial commitments and legal financial capacity to provide services. Listed below is a series of questions that will provide information about your community's financial condition and its ability to pay for the proposed facilities. The answers will give you a "snapshot" of the financial resources at your disposal to construct, operate, maintain the proposed facility.

- Over the past five years, has your community's population been stable, growing or falling?
- What is the current outstanding indebtedness of your community?
- How much additional debt can your community legally incur?
- What are your community's property tax revenues relative to the full market value of real property in your community?
- If your community proceeds with this project, can it still afford other proposed projects?
- What is your community's bond rating? Has it changed within the last two years?

The Financial Capability Guidebook has an added supplemental section to assist you in finding and interpreting the answers to these and other questions. Collectively, the information will provide assistance – but not the answer –to whether your community has the financial capability to undertake the proposed project.

MODEL FOR IDENTIFICATION OF REGIONAL COST BASIS

SYSTEM-WIDE CAPITAL COST BASIS

- **Proposed Regional Facilities:**
  Local share of capital cost of new components proposed in regional facilities plan.

- **Contributed Capital Facilities:**
  Value of existing facilities which are to be incorporated into regional system (based on an estimate of the replacement value, fair market value, or undepreciated value of the component).

  Estimated value of land on which existing contributed facilities are located (calculated at fair market value or other acceptable method).

- **Periodic Capital Requirements:**
  Additions, expansion, or replacement of equipment of system components (not included in initial facilities plan), as required by regional use.

SYSTEM-WIDE OPERATIONS AND MAINTENANCE COST BASIS

- **Direct Costs for Regional System O & M:**
  Annual costs directly attributable to regional operations and maintenance, identified in appropriate budget categories of the regional system operator.

- **Administrative Costs for Regional System:**
  Costs associated with management, administration, and overhead of the regional operator. For example, if a municipality operates the system, appropriate portions of administrative time must be identified in the municipal budget.

Source: Financial Planning for Wastewater Facilities: A Guide for Wyoming Local Officials, Part 3, "Regional Wastewater Facilities: Cost Sharing, Financing, and Intergovernmental Relations," (Wyoming Department of Environmental Quality), page 16.

APPENDIX L

1981 AMENDMENTS TO THE CLEAN WATER ACT

Analysis of sections of the 1981 amendments as related to EPA's Municipal Construction Grants Program:

Section 1 Short Title

"Municipal Wastewater Treatment Construction Grant Amendments of 1981," P.L. 97-117, enacted December 29, 1981

Section 2 Eligible Categories

After October 1, 1984 grants only for secondary or more stringent treatment, new interceptors and appurtenances and infiltration/inflow corrections, except

Governor of a state may elect to use up to 20 percent of a state's allotment to fund other types of projects previously eligible.

Section 3 Grants for Steps 1 and 2

After December 29, 1981 no grants solely for facilities planning and design (formerly Step 1 and Step 2).

Grants for construction (Step 3) shall include an allowance for facilities planning and design based on the percentage of total project costs which EPA determines is the general experience for such projects.

Each state shall use a portion of its funds, not to exceed 10 percent, to advance funds to potential grant applicants for facilities planning and design; advances are for small communities which in the judgement of the state would be unable to complete an application (i.e., facilities plan and design) without such advance; the allowance in a subsequent grant will be reduced by the amount of the advance; if no subsequent grant, state to seek repayment of advance under terms and conditions it may determine.

Section 6 Capital Financing

Grant applicants are encouraged to develop a capital financing plan which:

addresses future wastewater treatment requirements over at least 10 years,

projects the nature, extent, timing and cost of the future requirements,

sets forth the manner for financing these needs.

Section 7 Federal Share

After October 1, 1984 grants to 55 percent except subsequent segments of projects receiving a Step 3 grant before October 1, 1984 will receive 75 percent; possibly does not apply to collection systems and CSO's.

Section 8 Innovative and Alternative Processes

I or A grant funding to be additional 20 percent but in no case exceed 85 percent.

Reserve for I or A to be minimum of 4 percent and maximum of 7-1/2 percent of annual state's allotment of which 1/2 percent must be used for innovative projects.

Extends the I and A program through FY 1984.

Allows field testing of I or A processes or techniques as a grant eligible cost.

Section 9 Combined Step 2 and 3 Grants

Raises the dollar ceiling for combined Step 2+3 projects to $8,000,000.

Section 10 Reserve Capacity

After October 1, 1984 grant only for capacity needs on date of grant award and in no case exceed needs on October 1, 1990; grantees to pay incremental cost of additional reserve capacity except

Subsequent segments of projects receiving a Step 3 grant before October 1, 1984 shall be based on a 20 year reserve capacity and subsequent segments of interceptors receiving a Step 3 grant before December 29, 1981 shall include reserve capacity not to exceed 40 years.

Industrial cost exclusion is eliminated.

Section 11 Brand Name

When in grantee's judgement it is impractical or uneconomical to describe technical requirements for equipment, a brand name or equal may be used and grantee need not establish the existence of any other source.

Section 12 Engineering Performance

Engineering services shall continue for one year after completion of construction and include supervision of operation, training of operating personnel, and preparing training materials and curriculum for operating personnel, all of which are allowable for grant participation. After one year grantee must certify whether or not the treatment works meets the design specifications and effluent limitations.

If treatment works does not meet performance, it must be corrected in a timely manner at other than federal expense.

Section 14 State Administration Grants

States may use up to 4 percent of the state's allotment based on the amount authorized to be appropriated or $400,000, whichever is greater, to administer the Construction Grants Program.

Section 15 Water Quality Management Planning

States shall use up to 1 percent of the state's allotment or $100,000, whichever is greater, to carry out water quality management planning.

Section 17 Authorization

Authorizes $2.4 billion for FY 1982-85 for the Construction Grants Program.

Section 18 Water Quality Priority

Projects which receive priority are those projects which, in the estimation of the state, are designed to achieve optimum water quality management consistent with public health and water quality goals and requirements of the CWA.

Section 19 Cost Effectiveness

Reemphasizes that projects receiving grants shall be the "most economical and cost-effective combination of devices and systems..." for waste treatment over the life of the project.

Requires value engineering prior to grant award for all projects which exceed $10 million and which have not received a grant prior to December 29, 1981.

Section 20 State Certification

States with sufficient delegated authority to administer the Construction Grants Program may certify projects to EPA and EPA has 45 days to approve or disapprove the project. If EPA does not act, project deemed approved.

Section 21 Municipal Compliance Deadline

Municipal compliance to achieve secondary or more stringent treatment necessary to achieve water quality standards is extended from July 1, 1983, to July 1, 1988, for those cases which have not been able to move ahead due to limited federal grant assistance.

Section 22 Ocean Discharge

Application for ocean discharges waiver extended for one year from December 29, 1981 although new applications cannot be approved for one year. Does not apply to discharge of sludge through outfall sewer.

Section 23 Secondary Treatment Definition

Biological treatment facilities such as oxidation ponds, lagoons and ditches and trickling filters shall be deemed to be the equivalent of secondary treatment.

Section 24 Revised Water Quality Standards

States to review, revise or promulgate new water quality standards by December 29, 1984 or no grants may be awarded.

Section 25 Needs Survey

EPA to prepare new needs survey by December 31, 1982.

Section 26 Judicial Note

Where consent decrees have been established by the courts, the courts are to take note of the reduced funding levels and make appropriate adjustments if necessary in schedules.

APPENDIX M
May 12, 1982

federal register

Part III

Environmental Protection Agency

Grants for Construction of Treatment Works

APPENDIX N
May 12, 1982

federal register

Part III

Environmental Protection Agency

Procurement Under Assistance Agreements

APPENDIX O

THE ALTERNATIVE JUSTIFIABLE EXPENDITURE METHOD OF COST ALLOCATION

The basic principle behind the Alternative Justifiable Expenditure (AJE) method is to allocate costs of a multiple purpose project among its purposes so that each purpose shares the cost savings resulting from the multiple purpose approach. Grant funding is based on the cost of the pollution control component plus a portion of the joint cost. This policy assumes that achieving several purposes at the same time should be less costly than achieving them separately and that all purposes should share in the cost savings. The grant eligibility for multiple purpose projects of this type will ordinarily be less than the eligibility of a single purpose project with the same pollution-control objectives.

The cost allocation steps are:

1. Estimate the costs of the most cost-effective, single purpose alternatives (E) & (G) to obtain the same objectives as those of the multiple purpose project.

2. Determine the respective specific costs of each purpose in the multiple purpose project (B) & (D). The specific costs of a purpose are the sum of costs assignable to each project component exclusively serving that single purpose. An example of a specific cost would be the cost of a treatment plant included in a project designed to reuse water and reduce raw water consumption.

3. Calculate remainders by deducting the specific cost of each purpose in the multiple purpose project from the single purpose project cost (E-B=F) and (G-D=H).

4. From total cost of multiple purpose project (A) deduct all specific costs (B) & (D) to determine joint cost (C).

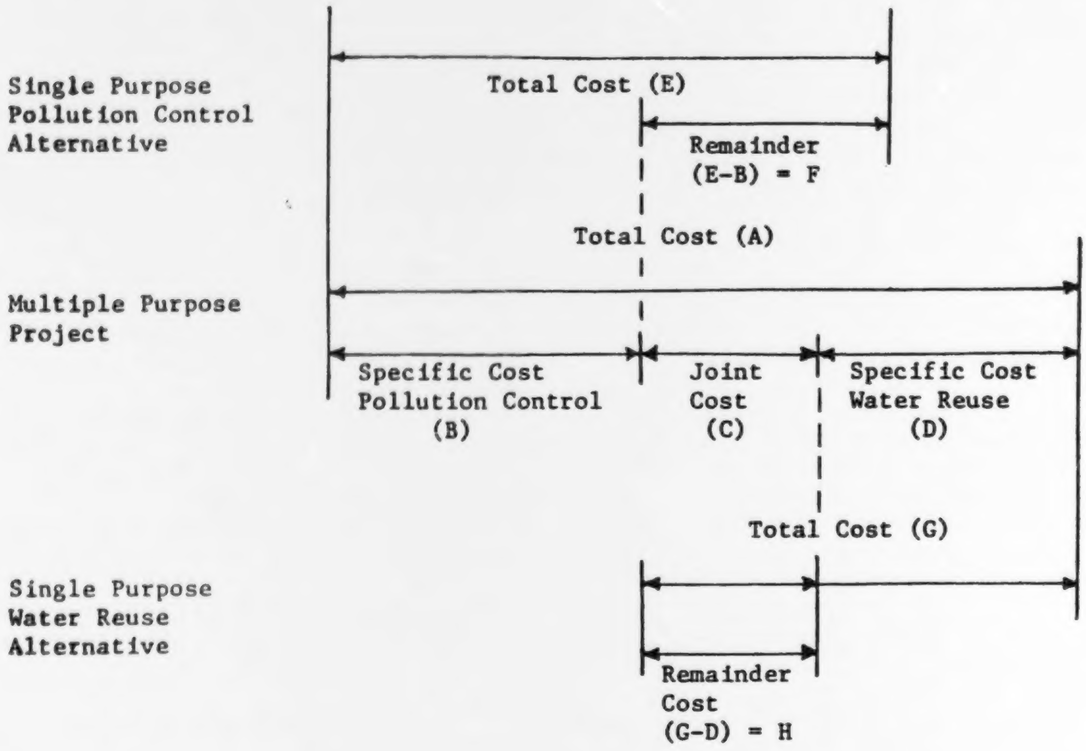
5. Distribute joint costs of the multiple purpose project among purposes in direct proportion to the remainders found in step 3.

$$\left(\frac{F}{F + H}\right) \; \& \; \left(\frac{H}{F + H}\right)$$

6. To obtain allocated costs for each purpose, add the specific and the distributed joint costs for each purpose (J & K).

It should be noted that none of the purposes will be assigned costs which are greater than the cost of the most cost-effective single purpose project nor less than the specific cost of the purpose.

ALTERNATIVE JUSTIFIABLE EXPENDITURE METHOD (continued)


Single Purpose
Pollution Control
Alternative
Total Cost (E)
Remainder
(E-B) = F
Total Cost (A)
Multiple Purpose
Project
Specific Cost
Pollution Control
(B)
Joint
Cost
(C)
Specific Cost
Water Reuse
(D)
Total Cost (G)
Single Purpose
Water Reuse
Alternative
Remainder
Cost
(G-D) = H

$$\text{Pollution Control Allocation} = B + \left(\frac{F}{F+H}\right) \times C = J$$

$$\text{Water Reuse Allocation} = D + \left(\frac{H}{F+H}\right) \times C = K$$

$$\text{Grant Eligible Fraction} = \left(\frac{J}{K}\right)$$